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TROPICAL DISEASES BULLETIN

Vol. 3. 1914. No. 2.

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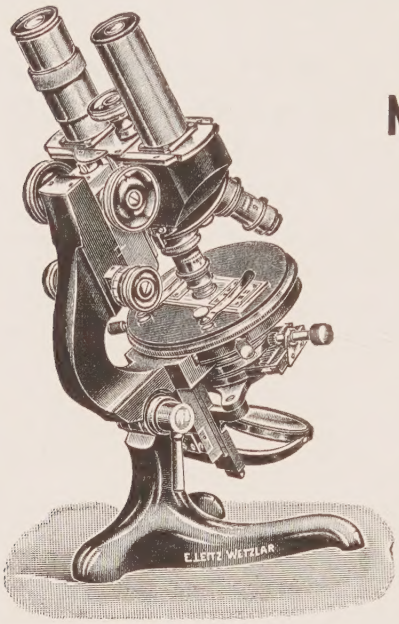

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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 2.

AMOEBIASIS AND DYSENTERY.

Amoebiasis.

Walker (Ernest Linwood) & Sellards (Andrew Watson). **Experimental Entamoebic Dysentery.**—*Philippine Jl. of Science. Sect. B. Trop. Med.* 1913. August. Vol. 7. No. 4. pp 253-331, with 1 plate.

This is a paper of extreme importance and great interest, but it contains so much valuable experimental work, and is of such length, that it is quite impossible to do justice to it in any abstract.

The authors set themselves the task of attempting to elucidate most of the disputed points concerning the rôle played by the various amoebae and entamoebae in the production of dysentery and the scope of their work and results and conclusions obtained can only be fully appreciated by reading the entire paper. All that can be here given is the summary and conclusions, which appear below *in toto.*

Summary and Conclusions. By Ernest Linwood Walker.

"This investigation was undertaken to determine experimentally the etiologic relationship of different species of amoeboid organizms to endemic tropical dysentery. It has consisted of 60 feeding experiments with the different species of *Amoeba* and *Entamoeba* that have been implicated in the production of this disease.

These experiments differ from those hitherto performed (1) in the number of comparative tests made of different species ; (2) in that the experiments have been more carefully controlled, and especially in that the species of amoeboid organizm fed to, and recovered from, the experimental animal in every case have been determined ; and (3) in the fact that the experiments have been made not upon the lower animals but upon man.

A. Twenty feedings of cultures, representing 13 strains and 8 species of *Amoeba,* isolated from the Manila water supply and other non-parasitic sources, from the stools of healthy persons or persons suffering from diseases other than dysentery, and from dysenteric stools, have been given to 10 different men, with the following results :—

1. The *Amoebae,* when ingested by men, can usually be recovered in cultures from their stools on Musgrave and Clegg's medium during the first few days after feeding, but never subsequently.

2. Microscopic examination of the stools of men after ingesting cultures of amoebae have been invariably and constantly negative.

3. None of the men who ingested cultures of amoebae have developed dysentery.

4. Therefore, the following conclusions appear to be warranted :—

(*a*) The cultivable amoebae are incapable of living parasitically in the intestinal tract of man.

(*b*) The amoebae, when obtained in cultures from stools, intestinal contents, or liver-abscess pus, are derived either from cultural contaminations or from encysted amoebae which have been ingested with water or food and have passed unchanged through the intestinal tract.

(*c*) The cultivable amoebae are non-pathogenic, and consequently play no rôle in the etiology of endemic tropical dysentery.

B. Twenty feedings with 5 strains of *Entamoeba coli* have been given to twenty different men with the following results :—

1. Cultures on Musgrave and Clegg's medium of the stools of men who have ingested *Entamoeba coli* have been invariably negative.

2. On the other hand, *Entamoeba coli* has been found microscopically, after a short incubation period, in the stools of every man who became parasitized, and the entamoebae have persisted in the stools of these men for an indefinite time.

3. Of the 20 men who ingested *Entamoeba coli*, 17 became parasitized at the first feeding, and 3 who did not become parasitized were reserved as controls.

4. The incubation period of *Entamoeba coli*, as determined by these experimental parasitizations, varies from one to eleven days, with an average of 4.7 days.

5. None of the 17 men experimentally parasitized, nor the 3 non-parasitized controls, have developed dysentery.

6. From these results, the following conclusions appear warranted :—

(*a*) *Entamoeba coli*, unlike the *Amoebae*, is a strict or obligatory parasite, and cannot be cultivated on Musgrave and Clegg's medium.

(*b*) *Entamoeba coli* is non-pathogenic, and consequently plays no rôle in the etiology of endemic tropical dysentery.

C. Twenty feeding experiments with *Entamoeba histolytica* have been made on 20 volunteers, with the following results :—

1. Cultures on Musgrave and Clegg's medium of the stools of men who have ingested *Entamoeba histolytica* have been invariably negative.

2. Microscopic examinations, on the other hand, have shown *Entamoeba histolytica*, after a short incubation period, in the stools of every man who became parasitized, and the entamoebae have persisted in the stools of these men for an indefinite time.

3. Of the 20 men who ingested *Entamoeba histolytica*, 17 became parasitized after the first feeding, 1 required 3 feedings before becoming permanently parasitized, and 2 who did not become parasitized at the first feeding were reserved as controls.

4. The incubation period of *Entamoeba histolytica* in these experimentally parasitized men has been found from one to 44 days with an average of 9 days.

5. In these experiments it has been possible to obtain :—

(*a*) Encysted "*Entamoeba tetragena*" exclusively in the stools of men who had ingested motile *Entamoeba histolytica* only.

(*b*) Motile *Entamoeba histolytica* exclusively in the dysenteric stools of men who had ingested "*tetragena*" cysts only.

(*c*) An alternation of "*tetragena*" cysts and motile *Entamoeba histolytica* several times repeated in the stools of a man who had ingested "*tetragena*" cysts only, and having attacks of dysentery alternating with normal stools.

6. Of the 18 men experimentally parasitized with *Entamoeba histolytica*, 4, or 22·2 per cent., have up to the present time, developed entamoebic dysentery.

7. The incubation period of the dysentery in these experimental infections has been 20, 95, 87, and 57 days, respectively, with an average of 64·8 days.

WALKER & SELLARDS.]

(Copied from THEOBOSIO S. ESPINOSA's Plate in the *Philippine J. of Science*, Vol. 8, Sec. B, No. 4.

The original figures were drawn from fixed and stained preparations at the magnification of Zeiss $\frac{1}{12}$ oil-immersion objective, ocular 3, and tube length of 160 millimeters, and with the aid of a camera lucida.

FIG. 1.—Motile form of a typical *Amœba*, cultivated from the Manila water supply. Note the small size, central arrangement of the chromatin in the nucleus, and the contractile vacuole.

FIG. 2.—Encysted form of the same species of *Amœba*. Note the small size and single nucleus with central arrangement of the chromatin.

FIG. 3.—Motile form of *Entamœba coli*, from the stool of a healthy person. Note the dense, granular structure of the cytoplasm, the relatively large amount of chromatin, and its peripheral arrangement in the nucleus.

FIG. 4.—Encysted form of *Entamœba coli*, from the stool of a healthy person. Note the large size, the relatively thick cyst wall, the 8 ring-form nuclei, and the absence of "chromidial bodies."

FIG. 5.—Motile form of *Entamœba histolytica*, from the stool of an acute case of entamœbic dysentery. Note the reticulated structure of the cytoplasm and the scanty chromatin in the ring-form nucleus.

FIG. 6.—The "*tetragena*" type of motile *Entamœba histolytica*, from a chronic case of entamœbic dysentery. Note the structure of the nucleus. It contain a heavier peripheral ring of chromatin —a part of which is detached from the nuclear membrane—than in the typical *histolytica*; and there is a central karyosome, consisting of a central granule surrounded by a circle of chromatin granules.

FIG. 7.—The precystated stage of *Entamœba histolytica*, from a "carrier" case. Note the small size, dense cytoplasm, and heavy peripheral ring of chromatin in the nucleus, which causes it to resemble a small *Entamœba coli*.

FIG. 8.—Encysted form of *Entamœba histolytica*, from a convalescent case of entamœbic dysentery. Note the small size, the cyst wall, the 4 ring-form nuclei, and the "chromidial body."

Typical Examples of Amœba and Entamœba.

(Copied from THEODOSIO S. ESPINOSA'S Plate in the *Philippine Jl. of Science*, Vol. 8, Sec. B, No. 4.

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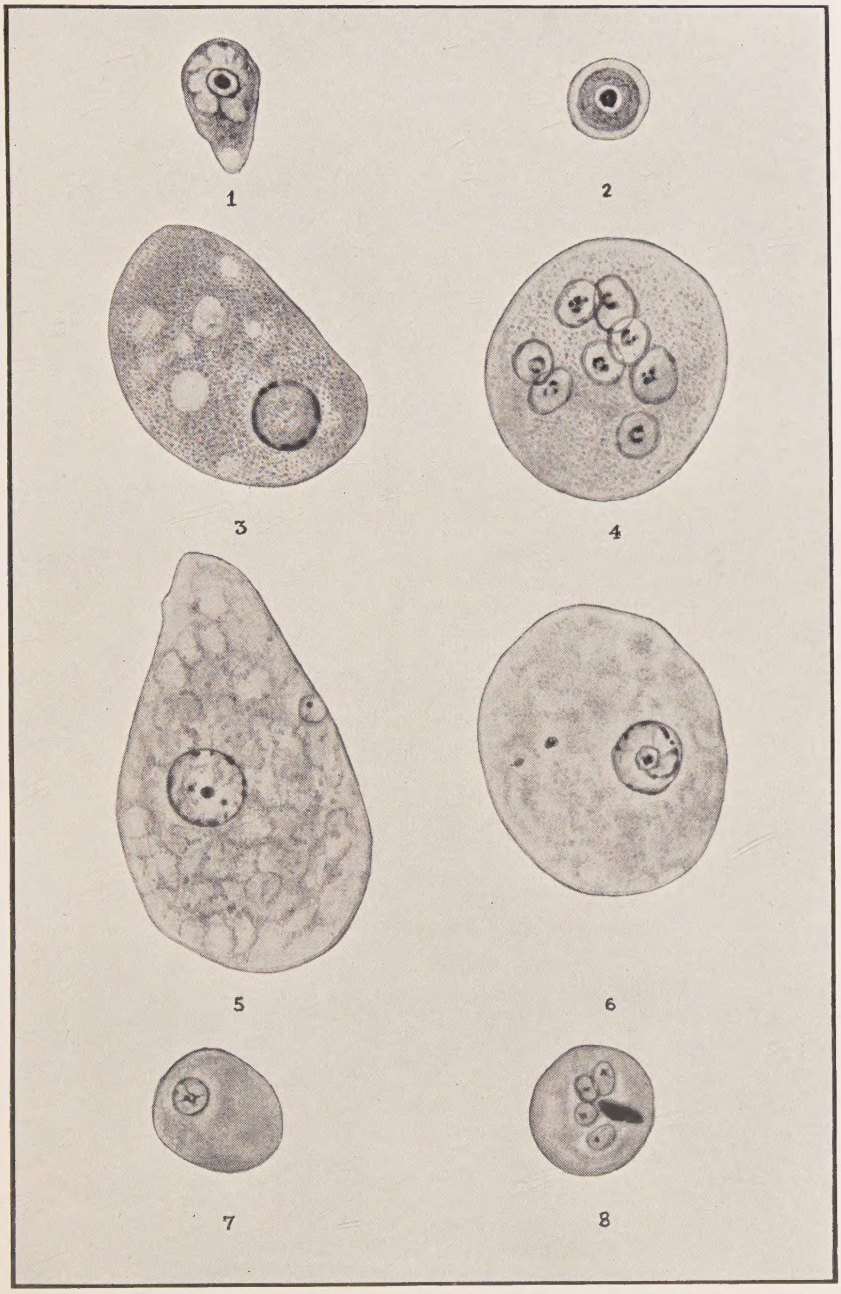
FIG. 7.—The preencysted stage of *Entamoeba histolytica*, from a "carrier" case. Note the small size, dense cytoplasm, and heavy peripheral ring of chromatin in the nucleus, which causes it to resemble a small *Entamoeba coli*.

FIG. 8.—Encysted form of *Entamoeba histolytica*, from a convalescent case of entamoebic dysentery. Note the small size, the cyst wall, the 4 ring-form nuclei, and the "chromidial body."



Typical Examples of Amoeba and Entamoeba.

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8. No cases of dysentery have developed in men who ingested *Entamoeba histolytica* from an acute case of entamoebic dysentery, from the liver abscess, nor in the 2 men who ingested *Entamoeba histolytica*, but who did not become parasitized with the entamoebae.

9. All of the experimental dysenteries have been obtained after ingesting *Entamoeba histolytica* from normal stools of "carriers." In 2 of the cases the infection was from "contact carriers" who had not, and have not subsequently developed dysentery, and in one of the latter cases 371 days, and the passage through 2 "contact carriers" intervened between the case of natural and the case of experimental entamoebic dysentery.

10. No cases of spontaneous entamoebic dysentery have occurred in this ward during the period of these experiments.

11. In consequence of the results obtained in these experimental infections of men with *Entamoeba histolytica*, the following conclusions appear warranted :—

(*a*) *Entamoeba histolytica*, like *Entamoeba coli* and in contrast to the *Amoebae*, is a strict or obligatory parasite and cannot be cultivated on Musgrave and Clegg's medium.

(*b*) "*Entamoeba tetragena*," Viereck is identical with *Entamoeba histolytica*, Schaudinn, and "*tetragena*" cysts are developed in the life cycle of *Entamoeba histolytica*.

(*c*) The large percentage of latent infections obtained in these experiments is wholly consistent with our clinical and pathological experience with entamoebic dysentery.

(*d*.) *Entamoeba histolytica* is the essential etiologic factor in endemic tropical dysentery.

D. Information believed to be of the greatest value for the diagnosis, treatment, and prophylaxis of entamoebic dysentery has been obtained in this experimental investigation.

1. Since it has been determined that *Entamoeba histolytica* is the specific etiologic agent, it will be possible to make an accurate laboratory diagnosis of entamoebic dysentery.

2. The distinction between the pathogenic *Entamoeba histolytica* and the harmless *Entamoeba coli* having been established, there will no longer exist an excuse for the indiscriminate treatment of all persons who show entamoebae in their stools.

3. The relatively long incubation period of this disease and the ability to diagnose latent infections make it possible to anticipate with treatment an attack of entamoebic dysentery.

4. Since there is evidence that ipecac. treatment, which is very efficient in relieving attacks of entamoebic dysentery and causing the entamoebae to disappear temporarily from the stools, does not always kill all of the entamoebae in the intestine, treatment should always be controlled by stool examinations for *Entamoeba histolytica*. By this precaution, relapses, so common in entamoebic dysentery, can be forestalled.

5. The following data have been acquired upon which to base a rational prophylaxis of entamoebic dysentery :—

(*a*) *Entamoeba histolytica* is the essential etiologic agent in the disease.

(*b*) The specific entamoeba is an obligatory parasite, and cannot propagate outside of the body of its host.

(*c*) The motile forms of this entamoeba, which are passed in the bloody mucous stools in acute dysentery, quickly die and disintegrate, and are probably, under natural conditions, incapable of withstanding passage through the human stomach.

(*d*) In consequence of the relatively long incubation period of entamoebic dysentery, the prevalence of chronic and latent infections, and the frequent failure of treatment to kill all of the entamoebae in the intestine, "carriers" of *Entamoeba histolytica* are common in endemic regions.

(*e*) These "carriers" are constantly passing in their stools large numbers of the resistant, encysted stage of *Entamoeba histolytica*.

6. These facts make it probable that "carriers" of *Entamoeba histolytica* constitute the chief, if not the sole, agents in the dissemination of entamoebic dysentery.

7. Prophylactic measures should, therefore, be directed towards "carriers" of *Entamoeba histolytica*, and should include the following:—

(*a*) The identification of "carriers" of *Entamoeba histolytica* by the microscopic examination of the stools of convalescents, household servants, and other suspects or persons whose employment or associations make them particularly dangerous to the public health.

(*b*) The sanitary disposal of fæces.

(*c*) The treatment, controlled by microscopic examination of their stools, of all "carriers" of *Entamoeba histolytica.*

8. Since the incubation period of entamoebic dysentery is usually long, and latent infections are common, the most efficient personal prophylactic measure is frequent stool examinations, as an index for treatment, of all persons residing in endemic regions."

S. R. Douglas.

DOUGLAS (S. R.). **Notes on Amoebic Dysentery from Papers published during the past year.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1282-1283.

A paper opening a discussion upon dysentery. At the present time many observers—for example DARLING and WENYON—believe that SCHAUDINN'S description of the life history of the amoeba causing dysentery is erroneous, and that the true life history of this organism is that described by VIERECK. It is now supposed that *Entamoeba histolytica* is the same as *E. tetragena.* As the author says, the situation has been admirably summed up by FANTHAM [see this *Bulletin*, Vol. 2, p. 166.]

With regard to the cultivation of the pathogenic amoebae, practically all observers are agreed that these protozoa have never been grown on artificial media, those cultures which have been obtained being of non-pathogenic varieties and frequently air-borne.

Reference is also made to cases of amoebic dysentery having occurred in patients who had never left France. Such cases, though rare, have also occurred from time to time in Germany and the British Isles. Rarer complications of the disease such as brain abscess and phagedenic ulceration of the skin are also described.

The paper terminates with the question of treatment. Due prominence is given to VEDDER'S important researches which led to the adoption by ROGERS of emetine in the treatment of the disease. In the past this drug had been given frequently as a substitute for ipecacuanha, with markedly good results, but had apparently passed from the ken of medicine again. Whether the emetine treatment is a radical one, as is claimed by ROGERS, can only be solved, the author thinks, by time and further careful experiments on animals.

G. C. Low.

BOURRET. **Recherches sur le Parasitisme intestinal, la Dysenterie et la Maladie du Sommeil à Saint-Louis, Sénégal.**—*Ann. d'Hyg. et Méd. Colon.* 1913. Apr.-May-June. Vol. 16. No. 2. pp. 283-307.

The authors examined the stools of 52 patients suffering from various diseases other than dysentery, and found Entamoeba only in

two cases. They were unable to identify to what variety these Entamoebae belonged.

In 33 cases of dysentery (20 Europeans and 13 natives), examination of stools revealed the presence of Entamoebae in every case ; the commonest variety was the *Entamoeba tetragena.* Attempts to obtain cultures of the *E. tetragena* were always unsuccessful, although *Amoeba limax* was frequently cultivated.

A few animal experiments were attempted, in most cases with negative results ; the only successful propagation of the disease occurring when young cats were used.

The following parasites were found associated with the *E. tetragena* in various cases :—

Lamblia intestinalis	..	on 5	occasions.
Undetermined flagellates	..	,, 2	,,
Trichocephalus [*Trichuris*] *trichiurus*		,, 1	,,
Necator americanus	..	,, 2	,,
Blastocystis enterocola	..	,, 2	,,

One case of what the author describes as " dysenterie bilharzienne " is referred to.

S. R. D.

MORIYASU. **The Amoebic Dysentery in Korea and its Blood Changes.**—*Sei-I-Kwai Med. Jl.* 1913. Sept. 10. Vol. 32. No. 9. (Whole No. 379). p. 115. (The original in No. 2, Vol. 1 of the *Jl. of the Japanese Med. Soc.* Nippon. Naikwa-gakkwai).

This is an abstract of a paper by the author in which he studies 16 cases of amoebic dysentery, and forms the following conclusions :—

1. From his experience in Korea he finds only the *Entamoeba histolytica* and never the *E. tetragena* in the fæces of cases of amoebic dysentery.
2. In 5 of these cases (33·5 per cent.) hepatic abscesses occurred, pus from which in some cases showed the pathogenic amoebae, but never bacteria.
3 The blood of patients with amoebic dysentery shows leucocytosis, and especially an increase in the polymorpho-nuclear neutrophiles. The eosinophile cells diminish as the disease progresses, finally disappearing from the blood before death.
4. The same blood changes occur in bacillary dysentery.

S. R. D.

BRAU (P.). **Amibiase intestinale.—Diarrhée noire.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. No. 8. pp. 567-569.

The author records cases of diarrhœa, in which the stools are of an ink black colour, due to entamoebae. These stools when examined microscopically generally show active entamoebae, but in some case cysts predominate. The former type of case rapidly recovers when treated with emetine subcutaneously, but the latter type is much resistant to treatment, so that it has been the author's practice to encourage by injudicious diet the conversion of these cysts into active amoebae, and then to treat the exacerbated symptoms with emetine, which effects a seemingly permanent cure.

S. R. D.

PHILLIPS (Llewellyn). **Amoebiasis. (1) Cerebral Abscess secondary to Amoebic Abscess of the Liver. (2) The Treatment of Liver Abscess discharging through the Lung.**—*St. Bart.'s Hospital Jl.*, 1913. July. Vol. 20. No. 10. pp. 158–159.

This paper consists of the report of three cases. The first is one of cerebral abscess following an amoebic liver abscess, and occurred in a European who contracted dysentery in 1912, in Egypt. He returned to England on sick leave and there developed a liver abscess which was successfully operated on, with the result that the general health improved, but was not altogether satisfactory.

On his return journey to Egypt he was taken ill, and suffered from headache situated in the occipital region. On his arrival in Cairo, he at once went into hospital; his temperature was 97° F. on admission, and rose to 101° F. the same day, pulse 60. The next day temperature was 101° F. in the morning, falling to 97° F. in the evening, pulse 56; Kernig's sign and tache cérébrale were present; there was some disturbance of vision, and during the whole of this period he complained of violent headache in the occipital region.

A lumbar puncture was performed and straw-coloured clear fluid was obtained, which on cultivation appeared to be sterile. He became delirious the same evening and died the next morning. Post mortem examination of the brain showed a small cavity in the left occipital lobe, containing about two drachms of semi-purulent fluid. The abscess cavity had no definite lining membrane. Unfortunately no microscopical examination of the pus or the abscess wall was made.

The other two cases are both of liver abscess which discharged through the lung; in one the treatment employed was the administration of ipecacuanha by the mouth; in the other emetine hydrochloride was given hypodermically. Rapid recovery, seemingly permanent, took place in both cases.

S. R. D.

LEGRAND (Hermann). **Abcès amibien du Cerveau opéré chez un Malade ayant presénté plusiers Rechutes de Dysenterie et Deux Abcès du Foie successivement opéré et guéris. Mort, Autopsie, Histologie et Cultures bactériologiques.** (Rapport de M. JACOB.)—*Bulls. et Mems. Soc. de Chirurgie de Paris.* 1913. Nov. 18. Vol. 39. No. 34. pp. 1435-1442.

The case was first admitted into hospital with a liver abscess, which was successfully located, opened and drained; recovery was rapid. Two months later another liver abscess formed and was again successfully treated, the patient returning home, and even working.

Five weeks later the patient returned to hospital, having had fever for a week, with violent headache, most marked over the right side. Within two or three days the condition became much worse, with slow pulse, stupor and paresis of the left side of the face and left arm, and this paresis increased and affected the left leg. A cerebral abscess was diagnosed and an operation performed, but no abscess could be discovered, and the patient died without recovering consciousness. The post mortem examination revealed an abscess in the right temporal lobe and no other active dysenteric lesion, the liver being normal, and the scars of the former operation very slight.

An examination of the fluid from the cerebral abscess showed no amoebae, but sections made from a portion of the abscess wall revealed them in large number. Cultures of the contents of the abscess made on serum media and incubated under anaerobic conditions, grew some very small colonies which on microscopical examination proved to be a minute coccus, which would only stain with carbol fuchsin. A similar organizm had been isolated from the contents of the first liver abscess. No growth took place under aerobic conditions.

S. R. D.

SITSEN (A. E.). **Merkwaardige Complicaties bij Amoeben-Dysenterie.** [Remarkable Complications of Amoebic Dysentery.]—*Geneesk. Tijdschrift v. Nederl.-Indie.* 1913. Vol. 53. No. 5. pp. 700-716. With 1 text fig.

An account of two fatal cases of dysentery with post mortem examinations. In the first case death was due to thrombosis of the portal vein. In the second there was an abscess in the liver, leading to thrombosis of the vena cava and pulmonary artery. Death was immediately due to an abscess in the brain. In connection with the first case, the author discusses the question whether liver-abscess is due to conveyance of amoebae by the portal vein, or whether, in the first instance, they are conveyed by the lymphatics, whose enlargement causes thrombosis in the vein.

S. R. D.

LESK (Robert). **Ueber seltenere Komplikationen der Amoebendysenterie. (Peritonitis e perforatione ulceris dysenterici coeci. Abscessus perityphliticus dysentericus, Parotitis, Strictura recti, Incarceratio interna.)** [On the rarer Complications of Amœbic Dysentery.]—*Geneesk. Tijdschrift v. Nederl.-Indie.* 1913. Vol. 53. No. 5. pp. 639-655. With 1 plate and 1 chart.

An uninteresting essay on all the possible complications of dysentery, based mainly on other persons' experience. There is a plentiful quotation of authorities. It, of course, sometimes happens in the course of a chronic disorder, like amoebic dysentery, that perforations of the bowel occur, or that sub-peritoneal abscesses develop, due to secondary infections. These the author thinks necessary to commemorate at length. In the title he makes mention of parotitis as a possible complication of amoebic dysentery, a thing which it would be interesting to know something of. On turning to the case, however, we find it to be one of a boy who came under treatment for double suppurative parotitis, and gave a vague history in addition of having had dysentery some months before. The glands were incised, and pus was let out, but it contained no amoebae. Quite probably the parotitis had nothing whatever to do with the dysentery. This it a fair sample of the author's acumen, and the way in which he makes up his paper.

S. R. D.

CANTLIE (James). **Hepatic Abscesses which open upwards through the Lung.**—*Jl. Trop. Med. & Hyg.* 1913. Nov. 15. Vol. 16. No. 22. pp. 345-347. With 2 text figs.

After touching on the difficulty of diagnosis of liver abscess, the author urges the necessity of early operation, and deprecates the continuation of treatment by ipecacuanha or emetine for too long a period, in the hope of bringing about the absorption of the pus. He points out the importance of perihepatitis as a sign that pus has formed, and the presence of a dry cough as an indication that the pus is tracking upwards. He describes the further signs and symptoms till the pus is coughed up, and states that although this causes temporary relief, relapses are frequent and may recur indefinitely.

The paths the pus takes in reaching the chest are then discussed, and may be summed up as follows :—

1. Infiltration and soddening of the whole base of the lung with a small opening into one of the smaller bronchi.
2. Tracking upwards towards the root of the lung in the cellular tissue of the mediastinum between the pericardium and the reflection of the pleura ; the abscess ulcerates into a large bronchus.
3. After passing through the diaphragm the abscess opens into the pleura and causes a localized empyema ; or,
4. Tracks along between the diaphragm and pleura, and points in an intercostal space.

The description is then given of an operation which the author performed for an abscess which had tracked up the mediastinum.

S. R. D.

CAZAMIAN.—**Abcès du Foie opéré, ouvert secondairement dans l'Estomac. Vaste Ulcère par Autodigestion de la Paroi. Mort.**—*Arch. de Méd. et Pharm. Navales.* 1913. Aug. Vol. 100. No. 8. pp. 138–150.

An account of a case of abscess of liver in a chronic dysenteric.

The abscess was opened and drained, and the patient showed signs of improvement for about five days, when signs of peritonitis appeared ; these, however, gradually subsided, and there was again a period of improvement. Between 3 and 4 weeks after the operation, the temperature again became raised, and the drainage tube had to be reinserted into the wound ; this allowed the escape of some pent up pus. The discharge continued profuse, and contained blood and bile. The wound broke down and ulcerated, and examination of the discharge proved it to be gastric juice. The patient died 47 days after the operation. Post mortem, an enormous abscess cavity was found in the liver opening into the stomach by an aperature as large as the palm of a hand. The wound in the abdominal wall was ulcerated, the ulcer measuring 10 cm. in diameter.

S. R. D.

CORDIER. **Dysenterie et Hépatite suppurée.**—*Ann. d'Hyg. & Med. Colon.* 1913. April–May–June. Vol. 16. No. 2. pp. 444–466.

The account of a case of multiple abscess of liver consecutive to

dysentery. In spite of the fact that attempts were made, on two occasions, to discover the locality of the abscess by aspiration, no pus could be found, and the patient died. Post mortem: the liver was found to be crowded with small abscesses, the largest being about the size of a nut; the spleen was enlarged and contained five or six similar foci of suppuration. Microscopical examination revealed the presence of amoebae in the walls of these abscesses.

S. R. D.

BOND (Ashton). **An unusual Case of Tropical Liver Abscess.** Church Missionary Society Hospital, Toro, Uganda.—*Brit. Med. Jl.*, 1913. Dec. 13. pp. 1536-1537.

The report of a case of liver abscess, the points of interest being (1) the somewhat unusual situation, the abscess forming a well defined tumour situated in the epigastrium and (2) that the patient was a native of Tropical Africa. No history or signs of dysentery are reported.

The patient recovered rapidly after the abscess was opened.

S. R. D.

HEYMANN (P.). **De l'Examen Radiologique du Foie, sa Valeur dans les cas d'Abcès.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1913. Oct. Vol. 4. No. 8. pp. 364-374. With 2 plates.

An account of four cases of liver abscess, showing the valuable help given by X-ray examinations, both for diagnosis and the result of treatment.

S. R. D.

i. DOPTER. **Le Chlorhydrate d'Emétine dans le Traitement de l'Amibiase.**—*Bull. Acad. Méd. Paris.* 1913. Séance du 18 Nov. Vol. 70. (3 ser.). 77e Année. No. 36. pp. 442-444.

ii. ORTICONI (A.). **La Dysenterie amibienne et le Chlorhydrate d'Emétine.**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 609-612.

iii. BIZARD. **Sur l'Emploi de l'Emétine dans le Traitement de la Dysenterie amibienne et de l'Hépatite.** *Ibid.* Oct. No. 8. pp. 564-567.

iv. BAUR (Jean) & PLISSON (L.). **Grand Abcès du Foie d'Origine dysenterique traité par la Ponction évacuatrice et des Injections d'Emétine: Bulle gazeuse intrahépatique; Guérison.**—*Bulls. et Méms. Soc. Méd. des Hôpit. de Paris.* Nov. 13. 33e Sér. Vol. 29. No. 32. pp. 478-498. With 4 figs.

v. DOPTER (M.) & PAURON (M.). **Contribution a l'Étude de l'Action de l'Emétine dans le Traitement des Abcès dysentériques du Foie.** —*Ibid.* Dec. 4. No. 35. pp. 683-691.

vi. TUFFIER. **Abcès du Foie traité par Emétine. (A propos du procès-verbal).**—*Bulls. et Méms. Soc. Chirurgie de Paris.* 1913. Nov. 25. Vol. 39. No. 35. pp. 1454-1455.

vii. des BARRES (Leroy). **Amibiase intestinale et Abcès du Foie. Traitement par l'Emétine et l'Ouverture de l'Abcès.** (Rapport de M. H. MORESTIN).—*Ibid.* Nov. 18. No. 34. pp. 1429-1435.

viii. SPITTEL (R. L.). **The Effects of Emetine on Abscess of the Liver.**—*Brit. Med. Jl.* 1913. Oct. 25. p. 1058.

ix. FIELD (F. E.). **Observations on Dysentery with special References to its Treatment by Hypodermic Injections of Emetine.**—*British Guiana Med. Annual for* 1912. pp. 1–7. With 2 tables.

x. LYONS (Randolph). **Emetine hydrochlorid in the Treatment of Amebic Dysentery.**—*New Orleans Med. & Surg. Jl.* 1913. Oct. Vol. 66. No. 4. pp. 278–282.

xi. CLOUD (R. E.). **A Case of Amebic Dysentery treated with Emetin hydrochlorid.**—*Jl. Amer. Med. Assoc.* 1913. Nov. 22. Vol. 61. No. 21. p. 1899.

xii. DESSY (S.) & MAROTTA (R. A.). **Contribución al Tratamiento de la Enteritis Disenterica y del Absceso del Higado (Amibiano) con el Método de Rogers.** —*Semana Medica.* 1913. May 15. Vol. 20. No. 20. pp. 1136–1141.

xiii. CARINI (A.). **O Chlorhydrato de Emetina no Tratamento da Dysenteria e da Hepatite Amebianas.**—*Annaes Paulistas de Med. e Cirurgia.* 1913. Oct. Vol. 1. No. 3. pp. 75–81.

i. The author, having treated five cases of liver abscess and 46 of amoebic dysentery with injections of emetine hydrochloride, sums up the efficacy of this treatment as follows :—

1. Emetine only acts on the lesions caused directly by the amoebae.
2. Although treatment with emetine quickly causes an amelioration of the symptoms of amoebic dysentery, such treatment is no guarantee against relapses.
3. Although the case is apparently cured, liver abscess may occur.
4. Although emetine possesses an undoubted amoebicidal action for the motile amoebae, the cystic stages are quite unaffected by its action.

ii. The report of a case of chronic dysentery of one year's duration. Examination of the stools showed amoebae in large numbers. Four to sixteen centigrams of emetine hydrochloride were administered daily, in all 74 cgm., with the result that the amoebae disappeared from the stools. About 3 weeks later amoebae were again present in the stools, and emetine was again administered, 4 cgm. being given daily, in all 20 cgm. Even then amoebae were still present, although the patient's general condition had improved greatly, practically all symptoms of dysentery being lost. Further emetine injections were advised, but the patient refused treatment.

iii. The record of five cases successfully treated with emetine. The only point of interest is, in the case of an infant aged 23 months, the administration of emetine per rectum, 1·5 cgm. of the hydrochloride being dissolved in 100 cc. of salt solution. Three such enemata were given and the case rapidly recovered.

iv. A very long and complete account of a case of liver abscess. The special points of interest are :—The large size of the abscess, two and a-half litres. After aspiration and injection of emetine solution into the abscess cavity, air was found by means of skiagrams to be present in the cavity. Six aspirations were necessary before the abscess

formation ceased. Emetine was given hypodermically. No amoebae were found either in the stools or in the liver pus.

The rectal injection of the pus from one of the later aspirations failed to produce dysentery in a kitten.

v. An account of two cases of liver abscess treated with emetine; there was marked amelioration of symptoms, but after a short time the condition became stationary. Rapid and seemingly complete recovery, however, took place after operation in the one case, and evacuation of the pus *per os* in the other.

vi. The account of a case of liver abscess following dysentery contracted in Morocco. While the patient was in hospital the abscess burst into the lung. Emetine in 4 centigram doses was administered for five days in succession with marked general improvement; ten days later, however, the symptoms returned, but quickly disappeared on continuation of the emetine treatment. At the time of writing the patient was practically well.

vii. The history of a case of amoebic infection, who when first observed had no dysentery or diarrhoea, and whose only symptoms were malaise and abdominal pain located principally in the right iliac fossa. An examination of the stools, which were quite normal to the naked eye, showed many amoebae, and in consequence, emetine hydrochloride was administered, 3 doses each of 4 centigrams being given. A further examination of the stools failed to reveal any active amoebae, but cysts were present in large numbers, and the patient's general condition improved. Within a few days, however, tenderness over the liver region was noticed, and the temperature rose, and these symptoms failing to disappear under treatment with emetine, the liver was explored by puncture, and an abscess was located and opened. The patient then quickly recovered.

viii. The report of a case of amoebic abscess of the liver which was treated by incision and hypodermic injections of emetine hydrochloride.

Six days after the operation, owing to the removal and replacement of the drainage tubes, pus escaped into the general peritoneal cavity, and the patient died 3 days later. The post mortem examination showed a cavity of a capacity of only 4 oz., although at the time of the operation $1\frac{1}{2}$ pints of pus were evacuated. Sections of the abscess wall showed rapid fibrotic changes.

ix. The author devotes the whole of his paper, except a few notes on the history and methods of the diagnosis of amoebic dysentery, to the treatment of the disease by hypodermic injections of emetine. A table is given showing the very satisfactory results thus obtained in 42 cases.

x. The account of 7 cases of amoebic dysentery treated with subcutaneous injections of emetine hydrochloride.

All the cases recovered rapidly, with one exception, who had peritonitis when admitted into hospital, and was found at the post-mortem examination to have gangrene of the large intestine, with three perforations. The doses of emetine hydrochloride given were from half to three-quarters of a grain per diem.

xi. The report of a case of chronic dysentery of $3\frac{1}{2}$ or 4 years' duration. Microscopical examination of the stools showed abundant

amoebæ. Emetine hydrochloride, ½ to 1½ gr., was given daily, in all 4 grains. Recovery was rapid and seemingly complete.

xii. A continuation of the authors' previous paper which was abstracted in this *Bulletin*, Vol. 2, p. 164. Four more cases of amoebic dysentery are related, in one of which an abscess of the liver had opened into the right lung two days before admission into hospital. The patient was expectorating pus in which amoebae were detected. In spite of this complication, treatment by ROGERS's method was brilliantly successful. Five injections of chlorhydrate of emetin were given on successive days, beginning with a dose of 2 cgm. which was increased to 4 cgm. for the last two injections, the total quantity used being 14 cgm. These doses were tolerated perfectly. In a week from the last injection all expectoration of pus had ceased, and the patient was convalescent. No other treatment was employed.

xiii. Six cases of amoebic dysentery and liver abscess treated with emetine with uniform success. The author is loud in his praises of the new remedy, which he thinks will prove an inestimable boon to practitioners in Brazil. The cases related are of an ordinary type and do not call for notice.

S. R. D.

NEUBERT. **Ueber die Wirkung von Uzara und geronnener Milch bei Darmerkrankungen.** [On the Action of Uzara and Sour Milk in Bowel Complaints.]—*Arch. f. Schiffs-u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 840-842.

An account of a case of amoebic dysentery treated with Uzara, a proprietary preparation recommended by WALDOW (this *Bulletin*, Vol. 1, p. 712), followed up by de-emetinized ipecacuanha, the patient being kept the while on a diet of sour milk. As the supply of Uzara gave out at the end of 10 days, before the patient was finally cured, the result is not as conclusive as could be desired. A few remarks are added on the benefit of sour milk in such cases, as a substitute for the usual gruel.

S. R. D.

CRAIG (Charles F.). **The Classification of Amoeba, with Special Reference to the Parasitic Species.** —*Amer. Jl. Trop. Diseases & Preventive Med.* 1913. Nov. Vol. 1. No. 5. pp. 351-361.

In this paper the author sets forth a classification of amoebae, "essentially that of Prof. CALKINS," and gives useful lists of genera and species.

"CALKINS divides the old genus *Amoeba* into seven genera, as follows:—*Amoeba*, *Vahlkampfia*, *Nagleria*, *Paramoeba*, *Craigia*, *Trimastigamoeba* and *Entamoeba*."

1. The genus *Amoeba*, Bory, 1822, "is characterized by large amoeboid organisms, having one or more nuclei and contractile vacuoles, the nucleus containing a large karyosome or scattered granules of chromatin. The ectoplasm and endoplasm usually distinct. Reproduction by division or sporulation." All the species are free living.

2. Genus *Vahlkampfia*, Chatton, 1912. "This genus contains amoebae characterized by the presence of one or more nuclei, dividing by simple division or a very primitive form of mitosis, and encysting to form a uninucleate cyst. A contractile vacuole is almost invariably present, and sometimes more than one. The nucleus contains a very large karyosome, which sometimes shows a distinct centriole. Habitat, water and earth. Have been observed as parasites." Small amoebae, originally classed in the genus *Amoeba* under the so-called *limax* type, most of them free living. Can be cultivated on artificial media. "No evidence demonstrating that they are pathogenic." "They may be easily distinguished from the true parasitic amoebae by the large nuclear karyosome, the uninucleate cyst, and the presence of at least one contractile vacuole."

3. Genus *Nagleria*, Alexeieff, 1912, emend. CALKINS, 1913. "In this genus CALKINS names one species, *Nagleria punctata* Dangeard, characterized by a nucleus containing a distinct karyosome, and two flagella situated at the anterior end of the body and equal in length to the body cell. Encystment occurs, the cyst being uninucleate. The species lives in pond water."

4. Genus *Paramoeba*, Schaudinn, 1896. "Characterized by an accessory body to the nucleus and a flagellated stage of existence." One species only, *P. eilhardi*, possessing two flagella, and found in a marine aquarium.

5. Genus *Craigia*, Calkins, 1912. The type species, *C. hominis*, is "characterized by a nucleus, an accessory nuclear body, and by an amoeboid and flagellate stage of development. In the amoeboid stage multiplication occurs by simple division, and by the formation of cysts containing numerous flagellated organisms. In the flagellate stage of development multiplication occurs by longitudinal division, preceded by division of the accessory body and nucleus. This parasite has been found only in the human intestine, and it is believed to give rise to a severe form of chronic diarrhoea." *C. hominis* was called by Craig (1906) *Paramoeba hominis*, but it has only one flagellum.

6. Genus *Trimastigamoeba*, Whitmore, 1911. The type species, *T. philippinensis*, is "characterized by a nucleus of the *limax* type, a contractile vacuole, and the occurrence, under certain conditions, of flagellate forms having three equal flagella. The species can be easily cultivated upon suitable media." It was first obtained from tap water in Manila.

7. Genus *Entamoeba*, Leidy, 1879. "The generic characters are as follows:—Size comparatively small, from 5 to 80 microns; ectoplasm and endoplasm distinct when the parasites are moving, and often when motionless; a contractile vacuole generally absent; nucleus with a definite karyosome and centriole; nuclear division mesomitotic and mitotic; reproduction by simple division, schizogony, or cyst formation, with the production of several daughter amoebae in the cyst. Habitat, the body of man or other animals, generally in the digestive tract. The genus contains only parasitic species, some of which are pathogenic, but most living merely as commensals in the intestines of their host. None of the species have been cultivated." A long list of species is given.

H. B. Fantham.

KUENEN (W. A.) & SWELLENGREBEL (N. H.). **Die Entamöben des Menschen und ihre praktische Bedeutung.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Nov. 15. Vol. 71. Nos. 5-7. pp. 378-410. With 2 plates & 15 text figs.

The authors give an account of the amoebae they encountered in hospital patients in Medan (Deli-Sumatra). They describe the variations of *Entamoeba coli*, some of which have been considered separate entities, e.g., *E. williamsi*, and then give an account of the development of *Entamoeba tetragena*, which is the specific dysentery amoeba of Sumatra. *E. tetragena* is considered to have three phases of development :—(1) as a tissue parasite, which the authors term the "histolytica phase;" (2) as an inhabitant of the gut lumen, the "minuta stage"; and (3) the cyst stage. Cytological details of each form are given. Details of cases in which the "histolytica form" was replaced by the "minuta form," and that by cysts, are given, together with some of the variations in the structure of amoebae found in stools.

The diagnosis of amoebiasis is described :—(a) by searching of blood-stained mucus, when erythrocytes ingested by the amoebae are a useful guide; (b) by examination of evacuations. Amoebae and cysts are then found. Confusion of the amoebic cysts with those of Trichomonas and Lamblia must be avoided. Cysts of *E. coli* and *E. tetragena* are differentiated, *E. coli* being distinguished by its double contoured cysts, its 8 nuclei, and its glycogen reaction with iodine. The difference in diameter and percentage of cysts having such diameters differentiates the quadrinucleate, mature *E. tetragena* from the immature 4-nucleate stage of *E. coli*. A chart illustrates this. Cyst stages are generally associated with "minuta" forms.

The resistance of amoebae and cysts to re-agents is considered. Sublimate, 1 per 1,000, kills cysts in 4 hours; creolin, 1 in 250 kills in 5-10 minutes; 50% alcohol, boiling water and Schaudinn's sublimate-alcohol kill at once. 10% formalin, acting only for a few minutes, does not kill the cysts. Cysts are less resistant on drying. This makes it unlikely that flies act as transmitters. Emetin acts differently on cysts and amoebae. The "histolytica" forms from fresh faeces mixed with emetin solution of 1 in 10,000 die in a few minutes, as ROGERS described. "Minuta" forms are much more resistant, an emetin solution of 1 in 5,000 giving some live amoebae after 48 hours. Cysts are extremely resistant, and some were not killed even with a concentration of 1 in 100 emetin acting for half an hour.

The two plates illustrate the morphology of *E. coli* and *E. tetragena*.

H. B. F.

i. WHITMORE (Eugene R.). **Free-living and Parasitic Amoebae and their Relation to Dysentery.** *Amer. Jl. Trop. Dis. & Preventive Med.* 1913. Sept. Vol. 1. No. 3. pp. 197-219. With 1 plate.

ii. WENYON (C. M.). **The Morphology of the Intestinal Amoebae of Man.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1287-1288.

These papers are reviews of our knowledge of the various entamoebae of man, and their relation to dysentery. They traverse ground familiar to those who have been following the abstracts of literature relating to amoebic dysentery in this *Bulletin*.

i. Whitmore's article is perhaps the more dogmatic. After an historical introduction, he discusses "the nucleus of vegetation forms" of *E. coli*, *E. histolytica* and *E. tetragena* on which he lays some stress, then chromidia formation and encystment. Lastly, some attention is given to pathogenicity and culturability. The author considers that to-day we are concerned with two intestinal amoebae in man, *E. coli*, a harmless commensal, and *E. tetragena* which is pathogenic. In conclusion Whitmore writes: "while expressing my belief that the parasitic amoebae have not been cultivated, I desire it to be distinctly understood that I am not an opponent of the attempts to cultivate the entamoebae, and I fully expect that they will be cultivated."

ii. Wenyon gives useful descriptions, based mainly on personal experience of *E. coli* and *E. histolytica* (including *E. tetragena*). Regarding the nucleus of entamoebae, Wenyon very wisely writes: "it seems to me that such a test as the distinctness or indistinctness of a nucleus as a guide to a differentiation of the entamoebae is quite inadequate. Not only is the nucleus of the entamoeba subject to wide variations, but the cytoplasm is equally variable." Wenyon regards *E. undulans* (Castellani) as a degenerate *Trichomonas*.

H. B. F.

AKASHI (M.). i. **Studien über die Morphologie und Entwicklung der** *Entamoeba coli* **Lösch emendata Schaudinn in Japan.**—*Beihefte z. Arch. f. Schiffs- u. Tropenhyg.* 1913. Nov. Vol. 17. Beiheft 8 pp. 5-18 [461-474.] With 2 plates.

ii. **Studien über die Ruhramöben in Japan und Nordchina.**—*Ibid.* pp. 19-43 [475-499]. With 2 plates.

i. The author describes *Entamoeba coli* as observed in the alimentary canals of Japanese. He states that during the vegetative phase of its existence *E. coli* differs greatly from *E. tetragena*, Viereck, the causative agent of dysentery among the natives of East Asia. Differences are shown in habits, movements and structure. The smaller 4-nucleate cyst of *E. tetragena* differentiates it from the 8-nucleate cyst of *E. coli*.

[The chief interest of the paper consists in the fact that it shows the uniformity of type of intestinal amoebae in Japanese dysentery with that found in other parts of the world.]

ii. The author gives an account of the amoebae found in cases of dysentery in N. China and Japan, prefacing his remarks by a slight historical sketch of the views of certain of the workers on dysentery. He considers that amoebic dysentery in Japan and N. China is due to one amoeba only, which he terms *E. tetragena*, Viereck. He recognizes two forms of trophozoites, large and small, the former occurring chiefly in blood-stained mucus of stools where it is active, has many vacuoles and contains many erythrocytes. The cytology of the nucleus is described, agreeing with the former accounts, as do also the remarks on cyst formation and structure. The cyclic period from the large trophozoite stage to the first encystment remains unknown. Cyst formation has never been seen in tissues.

The author devotes a section to the degeneration phenomena of Entamoebae as described by HARTMANN, and to *Entamoeba nipponica*,

Koidzumi. He considers that *Entamoeba nipponica* is not an entity, but is a mistaken interpretation of shed cells from the body, basing his arguments on differences of morphology and nuclear structure, the occurrence of such structures in stools from various diseases that are not dysenteric, and the fact that he has not observed movement of these structures. A differential diagnosis of *E. tetragena* concludes the paper.

The two plates illustrate stages of *E. tetragena*, the degeneration forms of HARTMANN, and degenerating body cells from stools, which the author considers to be *E. nipponica*, Koidzumi.

H. B. F.

GAUDUCHEAU (A.). **Sur l'État Parasitaire et le Rôle Pathogène d'une Petite Amibe.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 560-564.

The author has observed small cells, 8μ in diameter, in certain pathological fæcal matter in Hanoi and Canton. When fixed and stained the cells are seen to possess a nucleus containing a karyosome and a well-marked nuclear membrane. The cells directly observed in the human intestine are like the cultural amoebae described by the author in 1907 under the name *Entamoeba phagocytoides*. The author found these amoebae also in water. He observed that the adaptation of the water amoebae to culture media was rapid, whilst the intestinal amoebae took several months to adapt themselves. The cultures must be made "according to strict bacteriological technique," and not in Petri dishes exposed to the air. The amoeba varies in its properties. In external media and in old cultures it is only slightly pathogenic and easily cultivated, while in the intestine and in freshly isolated cultures it is pathogenic and not easily cultivated. The author thinks that there is a flagellate stage in the life-cycle of amoebae, and that they are polymorphic, there being intermediate forms between *tetragena* and *phagocytoides*. He believes that the small amoebae (*phagocytoides*) are strict parasites of the human intestine, and considers that the life-cycles proposed for human entamoebae "have been arbitrarily closed"; further, that in Indo-China, at any rate, pathogenicity must not be solely attributed to *E. tetragena* to the exclusion of *E. coli*.

H. B. F.

WHERRY (Wm. B.). **Studies on the Biology of an Amoeba of the Limax Group.**—*Vahlkampfia.* sp. No. 1.—*Arch. f. Protistenkunde.* 1913. Sept. 25. Vol. 31. No. 1. pp. 77-94. With 2 plates & 8 text figures.

The amoeba, *Vahlkampfia* sp., was isolated from the water supply of Oaklands, California, and was continued as a "pure-mixed" culture on Musgrave and Clegg's and other media. The trophozoites are capable of passing into a flagellate stage, when they have two flagella. The author states that in these amoebae the size and number of nuclei and method of multiplication are dependent on the environment. He discusses the symbiotic bacillus and an associated spirillum.

The author gives a detailed description of the morphology of the organism, and extends the definition of the genus.

H. B. F.

WILLIAMS (Anna W.) & CALKINS (Gary N.). **Cultural Amebae. A Study in Variation**—*Jl. of Med. Research.* 1913. Oct. Vol. 29. (New Ser., Vol. 24). No. 1. (Whole No. 140). pp. 43-56. With 4 tables and 4 plates.

The authors commence by stating:—"Careful study of the life histories of various types of protozoa has fully demonstrated that fixity of type must be interpreted within wide limits. Variations in form and size may be due to stages in the life cycle or to varying conditions of the environment." "No species can be accurately defined until not only its full life history, but also its variations and modifications under various conditions of environment have been ascertained." "The failure to take into consideration the power of amebae to vary widely has led to a number of loose statements, usually in the form of generalization from incomplete or inadequate observations and experiments."

The principal strain of amoeba investigated was one received from MUSGRAVE* and now cultivated "pure, without other organisms," on brain tissue medium. "The variations shown by cultural amebae from the intestine when subject to experimental control, are sufficient to indicate that forms described as parasitic in the human intestinal tract may vary under differing conditions." "The type of nucleus, for example, varies from that of Vahlkampf's *limax*, through *E. tetragena* type to the type of *E. histolytica*. If specimens of this strain were found in faeces, with a large karyosome, and with but little peripheral chromatin or none at all, they might be described as "free living" forms belonging to the genus ameba. If other characteristic specimens from the same strain were found with a broad zone of chromatin forming the periphery of the nucleus and enclosing a karyosome, often in the form of a ring, with or without one to several granules within it, they might be described as *Entamoeba tetragena*. If still other characteristic specimens were found with small karyosomes and peripheral chromatin extending through an achromatic network from the karyosome to the nuclear membrane, they might be described as *Entamoeba coli* or as *E. histolytica*." "Nor do the cysts escape the variations. Much apparently depends upon them for the identification of 'parasitic' from 'cultural' amoebae, the cultural forms 'always' having one nucleus." A table is given which "shows that at 34° C. as many as 9½% of the total number of these "cultural" organisms may have two nuclei, and 1% may have four nuclei in the cysts, while at 38° C. 21% of all the amebae may have two nuclei, and more than 9% may have four nuclei in the cysts. If some of these tetra-nucleated cysts were found in faeces they might well be described as cysts of *E. tetragena*."

Too much stress is not laid on their experimental results by the authors, who state that "conditions of the cultures might be such as to bring about variations when these do not occur under conditions 'normal' to the organism. But it is not impossible that analogous variations occur with the forms described as pathogenic, and it is unwise for anyone at present to be too positive in regard to the

* A strain from the *same* stock was examined by CRAIG, and declared to be a "free-living" amoeba.

distinctive features of *Entamoeba coli*, *E. tetragena*, and *E. histolytica*, or any of the Entamoeba group."

The plates illustrate amoebae grown on "brain-tissue medium with a hemoglobinophilic bacillus." Some of the illustrations are microphotographs.

H. B. F.

COURET (Maurice) & WALKER (James). **The Cultivation of Amoebae in Pure Culture upon Autolyzed Tissues.**—*Jl. Exper. Med.* 1913. Sept. 1. Vol. 18. No. 3. pp. 252-258.

"The purpose of this paper is to record the cultivation of amoebae upon autolyzed tissue without bacterial association." Pieces of sterile liver, kidney, and brain of healthy rabbits, guinea pigs, kittens, and human placentae in sealed sterile flasks, were kept in a thermostat at 40°C. for 10 to 20 days. Neutral or slightly acid autolyzed tissue fluid has given the best results; the acidity should not exceed 1·5%. The fluid is used on agar slanted tubes, the tubes being kept horizontal till absorption has occurred. The medium is then sterilized. Melted agar mixed with tissue juice also serves, but "the surface of such slants should be broken before using." Addition of peptone is not necessary. An amoeba from liver abscess has been cultivated, using the above medium, but the authors "were unfortunate in that the material from this abscess proved not to be sterile, and for the present still leaves the problem in doubt." The authors believe, however, that there is "little doubt but that the symbiosis was between amoebae and tissue, and not between amoebae and bacteria."

"Five species of amoebae isolated by one of us (Couret) from the intestine in frank amoebic dysentery, and growing in symbiosis with bacteria, and a culture of amoeba with *Bacillus typhosus* from Musgrave and Clegg have been separated from their associated micro-organisms, and have now been growing for several generations on autolyzed tissue. . . . ."

"The separation of amoebae cultivated from the human intestine from their bacterial symbiont, and their development upon various autolyzed tissues indicate that it is not the bacterium that is essential for the life of these protozoa, but the action of the living bacteria upon the protein contained in the media. This would explain the failure of many investigators to cultivate amoebae with dead bacteria or bacterial filtrates. . . . ."

"Whether the amoebae cultivated from liver abscesses and from the intestinal canal upon diverse autolyzed tissues are able to produce lesions similar to those from which they were isolated, or whether they are non-pathogenic species which are accidental contaminators to those responsible for frank lesions, remains still to be determined."

H. B. F.

MATHIS (C.). **Entamibes des Singes.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1913. Oct. Vol. 4. No. 8. pp. 388-410. With 4 plates.

The author gives a short historical resumé of the Entamoebae recorded from monkeys by various workers. He then describes the entamoebae which were very common among the monkeys of Tonkin, *Macacus rhesus* and *M. tcheliensis*. The observations were made on perfectly healthy monkeys. Two types of cysts were encountered: (1) cysts of the *coli* type with 8 nuclei; (2) cysts of the *histolytica*

(vel *tetragena*) type with 4 nuclei. The former is designated *Loschia legeri*, the latter, *L. duboscqi*. They are said to approach closely the *E. coli* and *E. histolytica* of man, particularly when encysted. The amoebae persisted for a long time in the intestine of the monkeys. At present experiments are in progress to determine whether these new entamoebae are pathogenic. The author points out that the presence of these entamoebae in the intestine of normal Macacus must not be overlooked when attempts are made to reproduce dysentery in these animals by means of human dejecta.

H. B. F.

Bacillary Dysentery.

Willmore (J. Graham) & Savage (A. Harold). **The Diagnosis and Treatment of Epidemic Bacillary Dysentery.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1283-1287.

This paper consists of an account of researches on dysentery amongst the pilgrims returning to Egypt, and is a continuation of the work published by Ruffer and Willmore in 1910.*

With regard to the agglutinating power of the patient's sera it was found that, using dilutions of one in twenty and one in forty, it was the exception rather than the rule to find only one type of dysentery bacilli agglutinated. The following table shows the results obtained with the sera of one hundred consecutive cases—four strains of bacilli were used :—

Table I.

Negative throughout	18
Shiga only	1
Flexner only	16
Tor only	10
87 up (lactose fermenter)	7
Shiga and Flexner	0
Shiga and Tor	6
Shiga and 87 up	2
Flexner and Tor	3
Flexner and 87 up	3
Tor and 87 up	6
Shiga, Flexner and Tor	6
Shiga, Tor and 87 up	4
Flexner, Tor and 87 up	5
Shiga, Tor, Flexner and 87 up	13
	100

Owing to the fact that agglutinins were absent in eighteen cases the routine practice for the diagnosis of bacillary dysentery was to plate out the stools of every case either on MacConkey's media or a special borated, lactose, cochineal agar (the exact composition of which is not given) and at the same time to test the serum against the four main types of dysentery bacilli. If a dysentery bacillus was isolated or a positive agglutination reaction for one or more bacilli was obtained, the case was considered to be one of bacillary dysentery, and this procedure the authors state to have given very good practical results although, as they note, it is open to theoretical criticism. The stools

* *Brit. Med. Jl.*, 1910. Nov. 12. pp. 1519-1522.

were also examined for entamoebae. In the following table the classification of cases according to their etiology, with figures for the previous years appended, shows the progressive diminution in the general mortality rate since the introduction of serum treatment.

TABLE II.

	1907.	1908.	1909.	1910.	1910–1911.	1911–1912.	1912–1913.
Total pilgrims	43,271	29,446	20,333	16,736	25,550	11,880	16,551
„ deaths	423	336	254	113	265	225	88
Per cent. mortality	1 (–)	1·14	1·25 (–)	0·67	1	1·9 (–)	0·53
Total dysentery admissions ..	—	155	212	138	328	199	75
Total dysentery deaths	—	82	134	45	71	139	9
Case per cent. mortality	—	53	63	32·6	21	53 / 70	12
Total serum-treated cases.. ..	—	0	12	91	173	0	54
Deaths among serum cases ..	—	—	0	15	30	—	7
Case per cent. mortality	—	—	0	16·5	17·3	—	12·9
Cases in which Bacillary Infection only was Present.							
Number of serum-treated ..	—	—	12	72	111	—	22
Deaths among these	—	—	0	7	19	—	2
Case mortality per cent.	—	—	0	9·7	17·1	—	9
Number not serum-treated ..	—	—	196	2	76	—	4
Deaths among such	—	—	134	1	20	—	2
Case mortality per cent.	—	—	70 (–)	50	26·3	—	50
Total bacillary cases	—	—	208	74	187	—	26
Mixed Amoebic and Bacillary.							
Number serum-treated	—	—	0	19	62	—	32
Deaths among these	—	—	0	8	10	—	5
Case mortality per cent.	—	—	0	42·1	16·1	—	15·6
Number not serum-treated ..	—	—	4	4	28	—	8
Deaths among these	—	—	2	4	6	—	0
Case mortality per cent.	—	—	50	100	21·4	—	0
Total mixed infection	—	—	4	23	90	—	40
Amoebic.							
Number of Cases	—	—	—	41	51	—	4
Deaths	—	—	—	19	16	—	0
Case mortality per cent.	—	—	—	45 (–)	32	—	0
Perforation, general peritonitis, etc.	—	—	—	—	6	—	0
Per cent.	—	—	—	—	12	—	0
Dysentery death-rate (per cent.) compared with total death-rate	—	25	52·8	40	27 (–)	62 (–)	10·26

This serum treatment consisted of the injection of large doses, 80 to 120 cc. of multi-valent serum either intravenously or subcutaneously, repeated twice daily or at longer intervals as the patient's condition demanded. The emetine treatment was introduced during 1912–1913, and was administered to all cases showing amoebae in their stools.

A chart is given showing the dysentery mortality per cent. for the years 1908–13, and it is to be noted that during the years 1911–1912 no serum was available, and there was a marked rise in the mortality.

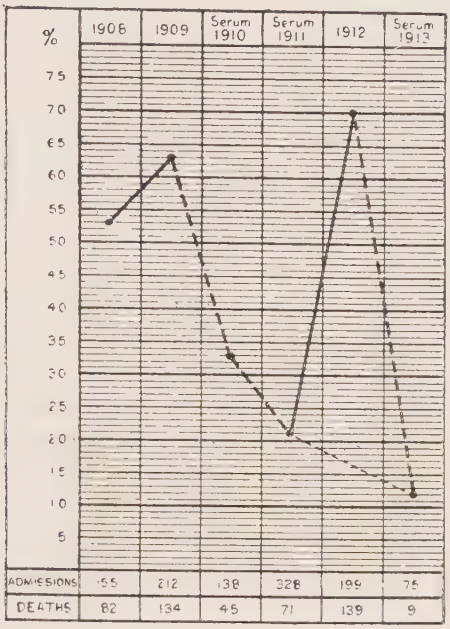

Chart showing dysentery mortality-rate per cent. for the years 1908—13.
(Reproduced, by permission, from the *British Medical Journal*).

The dark line of the curve indicates that no serum was used during that period; the broken line indicates that the bacillary cases were treated with serum.

Amongst other points discussed in this paper the authors state from the results of animal experiments that monovalent sera (prepared from Shiga's bacillus) were entirely wanting in any antitoxic value to other dysentery bacilli.

Another interesting observation was made with regard to the increase of albumin in the urine in patients suffering from nephritis who had received large doses of serum. It was at first thought that the treatment was causing an exacerbation of this condition, but investigation carried out with sera which had a precipitating action on horse or human showed that this increase of albumin was due to the excretion of the horse serum and not to an increase of the nephritis. The paper is concluded with some remarks on the general and dietetic treatment of the cases. S. R. D.

i. Brau. **Epidémie de Dysenterie Bacillaire observée à Saïgon en 1912.** —*Ann. d'Hyg. et Méd. Colon.* 1913. July.–Aug.–Sept. Vol. 16. No. 3. pp. 710-738.

ii. Huet. **Cas de Dysenterie observés en Juin 1912 à l'Hôpital de Saïgon.**—*Ibid.* pp. 739-741.

These papers give an account of an epidemic of bacillary dysentery

occurring at Saigon in June, 1912. Forty-six cases occurred among the artillery stationed there, and in thirty-three of these no amoebae could be found. The symptoms also were similar to those of bacillary dysentery, especially marked being the violent onset, presence of fever and the complete recovery in the non-fatal cases. Detailed accounts are given of twelve cases.

The bacteriological diagnosis, which forms the subject of the second paper, was positive in only three of the cases. From the stools of these was isolated a bacillus which the author believes to be *B. dysentericae* Shiga; its characters were: No production of indol; production of acid, positive in glucose and maltose broth, but negative in lactose, saccharose and mannite; non-motile. It was agglutinated by a Shiga serum (titre about one in three hundred) in a dilution of one in three hundred.

A few of the cases were treated with Dopter's serum in doses of 20 cc. with seeming benefit.

S. R. D.

GETTINGS (H. S.). **Dysentery Past and Present.**—*Jl. of Mental Science.* 1913. Oct. Vol. 59. No. 247. pp. 605-621.

This very interesting paper treats of bacillary dysentery of asylums. The author goes back to the time of the Middle Ages, when dysentery was a common disease of Europe, and shows how this ailment affected many events in history, and occurred in England in epidemic form even as late as 1849. He then traces the various outbreaks of this disease which have occurred in the Wakefield Asylum, and shows that since this institution was opened to patients in 1818, very few years have passed without cases of dysentery being recorded, and it has most probably been carried on from patient to patient ever since. The author concludes his paper by the following remarks :—

"This article is not brought forward merely as a historical recital, but because I believe the lessons it teaches are of value—as the lessons of history always are.

"For it shows that no amount of sanitation will stamp the disease out. It is no question of unsanitariness or of overcrowding, of the water supply, or of the other factors that have been proposed. They are only side issues, important in their way, but side issues all the same. It is the actual infection that matters; it is the chronic cases, the "carriers" who keep the asylum infection going, who originate fresh cases and epidemics. They form the keystone of the problem and must be detected and isolated before any permanent good can be done.

"It is with the infective person we must deal and not merely the aiding conditions. It is a difficult matter to detect them, I know, but it has to be done if the disease is to be eradicated. Much can be done by a strict segregation of all patients who have dysentery, or by routine examination of the stools. But the real hope lies in the laboratory, and I believe that if the problem were investigated it would not be long before the pathologist would be able to detect these carriers as to-day he detects the typhoid or the syphilitic. And if this could but be done, dysentery would soon be as much a thing of the past in our asylums as it is among the general population."

S. R. D.

Reid (D. McKinley). **On the Bacteriology of Asylum Dysentery in England.**—*Jl. of Mental Science.* 1913. Oct. Vol. 59. No. 247. pp. 621-640.

The author in the first part of his paper shows that in the past organisms approaching the Flexner type of dysentery bacilli have been usually isolated from patients suffering from asylum dysentery. He describes the technique used during his research, which consisted in plating the faeces on MacConkey's media, incubating for thirty-six hours, and then making subcultures from three of the non-lactose fermenting organisms.

Dealing with thirty-seven cases showing dysenteric symptoms, he was able to isolate Flexner-like bacilli from twenty-eight, either during life or post mortem. Of the remaining nine cases three showed organisms of the Gaertner group ; *B. proteus*, *B. pyocyaneus*, *B. foecalis alkaligenes*, and an organism resembling the Shiga bacillus were each isolated on one occasion, while in two cases only lactose fermenters were found. Twenty control cases who had diarrhoea but no dysenteric symptoms failed to show any dysentery bacilli.

A table is given showing the date of the onset of the disease, when the bacteriological examination was made, the result of this examination, mortality, etc. ; the principal point elucidated by this table is that the earlier the examination is made after the onset of the disease the greater is the likelihood of isolating dysentery bacilli.

The author next investigated the action of the various bacilli isolated on various sugars, etc., the results being given in a table. This, like all such tables, is somewhat confusing, but with one exception the bacilli appear all mannite fermenters and to approach the Flexner type.

Agglutination tests were carried out :—

1.—With the patient's organism and serum. The dilutions used were from one in fifty to one in four hundred, and it was common to obtain agglutination with dilutions of one in one hundred and sixty to one in three hundred and twenty. This agglutination was noticed once as early as the third day of the disease, but usually appeared later, was well developed at the end of a fortnight, and lasted often for months.

2.—With the patient's serum and a stock culture of B. Flexner, the agglutination thus obtained was usually present in rather lower dilutions.

3.—With the patient's organism and rabbit Flexner immune serum, the titre of this serum was one in 20,000 against a stock B. Flexner ; sixty-four per cent. of the organisms isolated by the author were agglutinated in one in 20,000 dilution, thirty-three per cent. in one in 10,000, and three per cent. in one in 5,000.

A few animal experiments were made, two rabbits being inoculated intravenously ; there was a fatal result in thirty-six hours with the typical lesions. Feeding experiments failed.

[With regard to the fermentation of sugars by the various strains of dysentery bacilli no one following the literature can fail to be struck by the discordant results obtained by various authors, and most probably such will continue to be the case until all workers use only absolutely pure sugars and exercise the greatest care in the manufacture

of the media. Maltose appears to be the sugar which causes most trouble. A paper by BUTLER appeared lately emphasizing these points (this *Bulletin*, vol. 2, page 397).]

S. R. D.

NATONEK (D.). **Zur Kenntnis der Dysenteriebacillen.** [A Contribution to the Knowledge of Dysentery Bacilli.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Nov. 15. Vol. 71. No. 5-7. pp. 337-338.

In a previous paper along with RAUBITSCHEK (*Centralblatt für Bakteriologie.* 1. Abt., Orig. vol. 69. 1913. p. 241), the author has shown that from a single case of typhoid fever numerous strains of typhoid bacilli may be obtained, differing definitely in their cultural reactions. With the Shiga-Kruse bacillus, however, the author finds that this is not the case. From two cases of Shiga-Kruse dysentery eighty-three cultures were made, but they all showed absolute correspondence in their type of growth and sugar-reactions.

S. R. D.

BUSCH. **Ueber serumfeste Ruhrstämme.** [On Serum-fast Strains of Dysentery Bacilli.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Nov. 15. Vol. 71. No. 5-7. pp. 515-520.

A record of agglutination results with bacilli isolated from two sporadic cases of dysentery, with remarks.

S. R. D.

FRIEDMANN (M.). **Die Ruhrepidemie beim Ulanenregiment Nr. 1 in der Kaiser Franz Josefs-Kaserne in Lemberg.** [The Epidemic of Dysentery in the First Uhlan Regiment, in the Kaiser Franz Joseph Barrack at Lemberg.]—*Der Militärarzt.* 1913. July 12. Vol. 47. No. 13. pp. 178-182; July 26. No. 14. pp. 185-190; and Aug. 9. No. 15. pp. 195-198. [Published with Nos. 29, 31 and 33 of the *Wiener Med. Wochenschr.* of those dates.]

A very complete account of an outbreak of bacillary dysentery which attacked eighty-seven men of the 1st Uhlan regiment of the garrison of Lemberg in August, 1912. No other troops in the garrison were affected, nor the civil population of the town. The local supplies of water and milk were examined and found to be beyond suspicion, and eventually the disease was found to have been imported by one soldier on his return from furlough, which had been spent in a place where bacillary dysentery was prevalent at the time. This man was admitted to hospital on August 3rd, suffering severely from the disease, and died a few days afterwards. From that date onwards until the 27th of the same month, eighty-six more men were admitted in small batches, suffering from the same complaint. Of these, forty-nine belonged to the man's own squadron and twenty-three and fourteen respectively to the two other squadrons of the same regiment. Only two cases proved fatal altogether, owing to the promptness with which the symptoms were treated, but the average stay of the cases in hospital was thirty-three days, showing a severe type of the disease.

It was eventually ascertained that the disease had been communicated from man to man through the dirty habits of soldiers when using the regimental latrines, and also from the prevalent habit of

removing horse-dung with the naked hands from the stalls of the stables and elsewhere, instead of using any appliances for the purpose. Sitting down to meals with unwashed hands would follow, especially in the case of men upon picket duty. As military surgeons have often pointed out before, cavalry soldiers are particularly liable to epidemics of dysentery and other diarrhoeal complaints, because men on duty in the lines and stables have to use the stalls and manure heaps as latrines when on guard almost inevitably. Disease is thus propagated with great facility throughout an entire regiment. Nor could the agency of flies be altogether excluded, because the outbreak occurred in hot summer weather.

The epidemic was suppressed by enforcing the most rigid habits of cleanliness amongst all men in the regiment when using latrines. A sentry was placed outside each one, who saw that every man put on a special pair of stable clogs before entering the latrine and took them off afterwards so as to keep his boots clean. Every man on leaving was also obliged to wash his hands in water provided for the purpose. All door handles, floors and seats were washed over several times daily with antiseptics, and a proper supply of toilet paper provided. The trenches were disinfected with lime. A similarly rigid practice was enforced in barrack-rooms before sitting down to meals, and all utensils, weapons and accoutrements were carefully sponged over and cleaned with antiseptic. The entire regiment was isolated from the rest of the garrison, and all dirty linen was sent to the wash separately in disinfected bags and vehicles. Thanks to these precautions no further cases occurred after the 27th of August.

As regards the treatment of men in hospital, twenty-eight received injections of dysentery serum in doses of 20 cc., apparently with great benefit. In some cases the dose was repeated. The stools of all convalescents were tested bacteriologically, and no man was discharged from hospital until the result had proved negative upon three successive tests made within fourteen days. The bacillus isolated was in every case of the Shiga-Kruse type. This result was obtained with:—

8	patients	after an	illness of	6	days' duration.
22	,,	,,	,,	12	,,
10	,,	,,	,,	14	,,
6	,,	,,	,,	15	,,
5	,,	,,	,,	23	,,
7	,,	,,	,,	28	,,
9	,,	,,	,,	32	,,

In addition, all men released from hospital had their stools disinfected for from two to three weeks afterwards, even though the previous bacteriological examination had been negative, special receptacles being used for the purpose. Finally, the whole barrack was disinfected, room by room, with all its contents, and the men belonging to each room were compelled to purify their persons by a special hot bath, and to put on clean or disinfected clothing before being allowed to re-enter it, by which means the epidemic was finally brought to an end without extending beyond the regiment originally attacked.

The entire paper is well worth perusal by military surgeons as an example of the way in which such epidemics should be dealt with.

S. R. D.

CANAVAN (M. M.). **Third Note* on the Persistence of Agglutinins for *Bacillus Dysentericae* in the Danvers Hospital Cases.**—*Boston Med. & Surg. Jl.* 1913. Oct. 30. Vol. 149. No. 18. pp. 643-645.

This paper records an investigation into the persistence of the agglutinins for *B. dysentericae* in the blood of patients who have passed through an attack of the disease. The patients from whom the blood was derived appear to have had their dysentery in 1908. The results are given in the following table :—

		B. SHIGA.			B. FLEXNER.		
Dilution of Serum.		1—20.	1—40.	1—80.	1—20.	1—40.	1—80.
Case No. 87.							
Oct.	1908	+	+	+	+	+	+
Feb.	1909	0	0	0	+?	+?	0
Mar.	1909	++	0	0	+	0	0
Jan.	1910	+	0	0	0	0	0
Apr.	1910	+	+	+	0	0	0
Dec.	1911	0	0	0	0	0	0
Case No. 90.							
Oct.	1908	+	0	0	+	+	+
Feb.	1909	++	++	+	0	0	0
Mar.	1909	+	+	—	0	0	0
Jan.	1910	+	+	+	0	0	0
Apr.	1910	+	+	+	0	0	+
Dec.	1911	+	0	0	0	0	0
Case No. 99.							
Oct.	1908	++	++	++	0	0	0
Feb.	1909	+	0	0	+	+	0
Mar.	1909	++	0	0	+	0	0
Jan.	1910	+	+	0	0	0	0
Apr.	1910	+	+	+	0	0	0
Dec.	1910	0	0	0	0	0	0
Case No. 101.							
Oct.	1908	+	+	+	0	0	0
Feb.	1909	0	0	0	+	+	0
Mar.	1909	0	0	0	+	0	0
Jan.	1910	0	0	0	0	0	0
Apr.	1910	0	0	0	0	0	0
Dec.	1911	0	0	0	+	+	+
Case No. 107.							
Oct.	1908	0	0	0	0	0	0
Feb.	1909	0	0	0	0	0	0
Mar.	1909	0	0	0	+	+	+
Jan.	1910	0	0	0	0	0	0
Dec.	1911	+	+	?	0	0	0
Case No. 108.							
Oct.	1908	++	++	++	0	0	0
Feb.	1909	0	0	0	0	0	0
Mar.	1909	0	0	0	+	0	0
Jan.	1910	0	0	0	+	0	0
Apr.	1910	0	0	0	0	0	0
Dec.	1911	+	+	+	0	0	0
Case No. 110.							
Oct.	1908	0	0	0	0	0	0
Feb.	1909	0	0	0	++	++	++
Mar.	1909	0	0	0	0	0	0
Jan.	1910	0	0	0	+	+	0
Apr.	1910	+	+?	0	0	+?	0
June	1910	0	0	0	+	+	0
Dec.	1911	0	0	0	0	0	0

* For first and second notes see *Boston Med. & Surg. Jl.*, 1909, Nov. 11, vol. 161, & 1910, Aug. 4th, vol. 163.

In case No. 124, the patient, who had had dysentery sixteen years before 1911, gave an agglutination to B. Flexner in one in eighty dilution in 1910, and in a dilution of one in twenty in 1911. The author believes the agglutinating of the serum varies from time to time, but that this should be the case, unless the patients are "carriers" of dysentery organisms, appears unlikely. A possible explanation of these variations is that the ease with which the organisms are agglutinated varies; such is certainly the case with cultures of *B. typhosus*, which are well known to vary greatly with regard to the ease with which they are agglutinated with specific sera, and at times cultures, especially those which have been subcultured on artificial media for long periods, are quite unaffected by agglutinating sera.

S. R. D.

i. Bauer (J.), Ellenbeck & Fromme. **Ueber Y-Ruhr bei Säuglingen und kleinen Kindern.** [On Y-Dysentery in Breast-fed Infants and Young Children.]—*Arch. f. Kinderheilkunde.* Festschrift A. Baginsky. 1913. Vol. 60-61. pp. 35-84. With 17 curves.

ii. Siegel (E.). **Ueber Y-Ruhr bei Säuglingen.** pp. 689-698.

i. This paper, though of immense length, contains few facts of general interest. It describes an outbreak of bacillary dysentery in a charitable institution for indigent mothers and their children at Düsseldorf. To reduce the expenses of the institution a laundry formed part of it, which took in washing from the town. Probably in this way bacillary dysentery was introduced into the institution, the mothers who worked in the laundry also washing their infants under not altogether satisfactory conditions of cleanliness. The outbreak was only brought to an end by sending off to the public hospital all the affected children, and such of the mothers and nurses as showed a positive serum-reaction to the bacillus isolated from the stools of the children, which was of the Y-type. That such laundries will form a good channel of infection seems obvious, and therefore they should be discouraged where infants are congregated together in large numbers and are washed, quite probably, with dirty water from the laundry, to save trouble.

ii. The clinical histories of eight children, all under one year of age, who were affected with dysentery due to the Y-bacillus. Out of the eight, four died. The stools contained blood in all cases. The most efficacious treatment seemed to be to keep the children on a so-called hunger diet for one to two days, nothing but tea being given; this was followed by malt-broth (*Malz-suppe*) as recommended by Wilderhofer, and buttermilk. Albumen water seemed to be less successful.

S. D. R.

Rogers (Leonard). **i. The Rational Treatment of Chronic Bacillary Dysentery; and the Advantages of Enemata of Silver Gelatose.**—*Brit. Med. Jl.* 1913. Nov. 8. pp. 1198-1200.

ii. The Bactericidal Action of Organic Silver Salts and other Antiseptics on the Dysentery Bacillus. *Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 263-269.

The author's first point of interest is a statement that in chronic

bacillary dysentery the lesions are nearly always limited to the lower portion of the large intestine, and that in consequence of this distribution remedies administered rectally are much more likely to be efficacious than if the upper part of the large intestine was affected. The author then gives the results of experiments carried out by him *in vitro* to determine the bactericidal action of various antiseptics against the dysentery bacilli; the experiments were carried out with emulsions of bacilli made both with water and with broth. The result is interesting, for whereas solutions of nitrate of silver killed the watery emulsions of dysentery bacilli in dilutions of one in 10,000 yet when the emulsions were made with broth one in 100 to one in 500 was the greatest dilution that had killing power. When, however, organic silver compounds were used it was found that the broth had no inhibitory power, that solutions of one in 500 of such a substance as silver gelatose were quite equal to the same substance's power in the presence of watery emulsions.

Further experiments showed that broth had a marked inhibitory effect on the action of various antiseptics such as permanganate of potash, quinine bisulphate and boracic acid.

The author concluded that the substances most likely to exert an efficient bactericidal action would be the organic silver compounds, and he states that on treating chronic bacillary dysentery cases with enemata of these compounds his hopes were completely justified.

Details of three cases are given, and an analysis of some further cases is added, most of which quickly improved under this treatment.

S. R. D.

Mixed Dysentery.

Cunningham (J.). **A Résumé of our present knowledge of Dysentery.** —*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 92-118.

The author gives in this paper a very good account of our knowledge of dysentery up to the time of its publication. The discordant results obtained in the biochemical tests applied to separate the varieties of dysentery bacilli are very well shown in various tables. As regards amoebic dysentery events have travelled so fast that the author's account of the rôle of the various amoebae and entamoebae has already become out of date, but at the time of publication his account was a good one of the various opinions on these subjects.

S. R. D.

Rodgers (R. T.). **Dysentery in the Raipur Central Jail, C.P.**—*Indian Med. Gaz.* 1913. Nov. Vol. 48. No. 11. pp. 424-428. With 2 charts.

This paper consists of a rather confused account of the dysentery occurring in the Raipur Central jail. The principal points of interest related are :—

1.—That the greatest incidence of the disease is during the wet weather.

2.—Ankylostomiasis is not an important factor.

3.—That the disease is most probably of the bacillary type, and as good results were obtained both in treatment and prophylaxis with a

vaccine prepared from *B. dysentericae* Shiga; the author believes this to be the peccant organism.

4.—Trichomonas was found in thirty-one out of thirty-five cases of dysentery; this organism was not more than 10μ in length, and frequently only 6 or 7μ, but the author appears very uncertain to what extent it was to blame in the production of the dysenteric symptoms.

5.—Amoebic dysentery was uncommon.

S. R. D.

RODENWALDT (E.). **Dysenterie in Togo.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. p. 842.

The author in previous communications has tried to show that in Togoland bacillary dysentery is the form met with on the coast, whilst in the interior amoebic dysentery is more prevalent. About half a dozen fresh cases are cited in support of this opinion.

S. R. D.

HINTZE (K.). **Operieren oder Nichtoperieren bei chronischer Dysenterie.** [The Question of Operating or not Operating in Chronic Dysentery.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Sept. Vol. 17. No. 17. pp. 581-592. With 4 charts.

In opposition to the views expressed by O. MÜLLER, of Hongkong, recommending appendicostomy as a routine operation in cases of chronic dysentery (this *Bulletin*, vol. 1, p. 187), the author discusses what can be done by milder remedial measures in such cases. He points out that in amoebic dysentery ipecacuanha is often not given in sufficiently massive doses, and that in any case the practitioner has now ROGERS'S treatment with emetin to fall back upon. Details are given of four cases in which such treatment was persisted in until cure, one case receiving as much as 8¼ grains of hydrochloride of emetin hypodermically, in the course of twelve days. With regard to bacillary dysentery the author places most faith in the persistent employment of large enemata of water with or without the addition of tannin or silver nitrate. Sufficient perseverance with these remedies is almost always successful in his own practice.

S. R. D.

LESSING (Frank M.). **Note on Ozone in the Treatment of Dysentery.**—*Lancet.* 1913. Nov. 1. p. 1255.

The account of a case of dysentery at first treated without benefit with ipecacuanha and opium. The following treatment was then tried: The large intestine was washed out with ozonised water, large quantities of this ozonised water were also administered by the mouth, and the air of the sick room was ozonised. The author, although stating that treatment with ipecacuanha and emetine was continued, seems to believe that the improvement which took place was largely due to the ozone.

S. R. D.

STILES (C. W.) & KEISTER (Wm. S.). **Flies as Carriers of Lamblia. Spores. The Contamination of Food with Human Excreta.**—*U.S. Public Health Rep.* 1913. Nov. 28. Vol 28. No. 48. pp. 2530-2534.

The authors, after referring to a paper by one of them (Stiles), in which he concluded that the presence of *Entamoeba coli*, Lamblia or Trichomonas in the stools of seemingly normal individuals is a proof of fæcal contamination of the food, and that the frequency of such contamination can be gauged by estimating the percentage of the population which harbours these parasites (see this *Bulletin*, vol. 1, p.724), proceed to investigate the rôle played by flies as carriers of these parasites. The conclusion arrived at that flies commonly act as spores of these protozoa does not seem very conclusive; whereas in communities having a sewer system of drainage as many as twenty per cent. of the population were infected, in those communities in which open privies were in use and a veritable plague of flies was present, having free access both to the privies and food of the inhabitants, and in which there were many other sources of infection, only a further ten per cent. of the population harboured these parasites.

S. R. D.

BALANTIDIAL DYSENTERY.

BEHRENROTH (E.). **Das *Balantidium coli* und seine pathogene Bedeutung.** [*Balantidium coli* and its Pathogenic Significance.] —*Arch. f. Verdauungs-Krankheiten.* 1913. Oct. 15. Vol. 19. pp. 42-62. With 2 text-figs.

A case of intestinal ulceration in Prussia due to *Balantidium coli.* The patient, a farm labourer aged sixty-one, was admitted to hospital suffering from diarrhoea of some six weeks' duration, along with emaciation and progressive weakness. The stools numbered from fourteen to sixteen in a day, and were foul-smelling, pultaceous and alkaline. The microscope showed large numbers of an organism which was recognized as *Balantidium coli.* Examination of the rectum with the rectoscope showed congestion and superficial ulceration with, at one point, a distinct tumour with raised and thickened edges, covered with mucus. Treatment was initiated on June 5th with thymol, given in four gramme doses every two days. Immediate improvement ensued, the stools being reduced to two or three a day, of nearly formed consistence, but as the microscope still showed the presence of infusoria, mostly dead or encysted, the treatment was changed on the 20th of the same month to de-emetinized ipecacuanha, given in pills containing six centigrammes each, to the number of thirty a day. The number was gradually increased to sixty pills a day, and afterwards reduced to forty pills, with the result that by July 4th all the symptoms had subsided, and treatment was discontinued. A rectal examination showed that all the local lesions were healed, and the microscopic examination of the stools was negative.

Balantidium coli is a ciliate protozoan belonging to the order Heterotricha, covered all over with cilia and consequently capable of active movement. It possesses two nuclei and two contractile vacuoles, a funnel-shaped mouth and an anus. The size varies, but may be

given at an average as 114 by 74μ. It multiplies by division, but sexual conjugation has not been observed with certainty. Its normal host is the pig, in the colon of which it is to be looked for principally near the caecum. It does not seem to cause any pathological lesions in the pig. Two allied forms, *B. minutum* and *B. giganteum* have been described as causing similar lesions in man. The organism seems to have been first detected in man by the celebrated microscopist LEEUWENHOCK, when examining his stools when suffering from diarrhoea. It was again described by MALMSTEN in 1856, and from that time up to the present 142 cases of its occurrence in man seem to have been recorded, the majority in Finland, Russia, and Sweden. [Many cases have been recently described from the Tropics.] In the majority of instances in the human being the patients have been farm workers, and so brought into contact with pigs. Dirty hands are probably the medium of infection.

The lesion caused in the human subject by *Balantidium coli* takes the form of chronic ulceration of the colon, resulting in diarrhoea, emaciation and loss of strength. The disease may prove fatal by the continuance of these symptoms. One case of intestinal perforation is on record. The disease never extends above the ileo-caecal valve. The symptoms are as given above. There is never any marked pyrexia whereby the condition may be distinguished from enteric fever or dysentery, which it otherwise resembles. The spleen is never enlarged, and there is never any metastasis to the liver or other organs, though one doubtful case of a lung abscess is reported. Microscopic examination of the stools will show innumerable motile organisms. These seem to be able to penetrate into the submucous tissue in the same way as amoebae. The condition does not seem to show much tendency to natural cure, and may last for months or years, if it does not prove fatal.

Injections of various substances into the bowel have been tried, such as quinine (one per 1,000), acetic and tannic acids (fifty grammes of acetic acid and five grammes of tannin in two litres of water), iodine (one in 5,000), silver nitrate (one in 3,000), salicylic acid (one in 2,000) and so on, all more or less ineffective. The author's treatment of four grammes of thymol, given by the mouth in divided doses, seems as good as any method for checking the diarrhoea, but the symptoms return when the medicament is stopped, for which reason the author resorted to de-emetinized ipecacuanha. In one case appendicostomy has been performed with subsequent washing out of the bowel with quinine and nitrate of silver solutions; the result was brilliant. Specific anti-bodies do not seem to be formed in the affected individuals.

Infection experiments with lower animals seem generally to be unsuccessful. LÖSCH succeeded on one occasion in producing in a dog bloody stools containing Balantidia, and after death found inflammation of the rectal mucous membrane, and three superficial ulcers containing the organism. On one occasion also a kitten was made a carrier of the organism for a short period. With these exceptions man seems to be the only organism to which the infusorian is pathogenic.

An excellent bibliography of the cases reported, chiefly German, concludes the paper.

S. R. D.

BRAU. **Dysenterie balantidienne en Cochinchine.**—*Soc. Med.-Chirurg. de l'Indochine.* 1913. Oct. Vol. 4. No. pp. 384-387.

In the author's opinion this disease is an uncommon one in Cochinchina. Two cases are reported, one a native soldier, the other a European. The organisms found in the native were 30–35μ in length and 20μ in breadth; movements were rapid and the cilia very apparent. In the other case the organism was enormous, being about 200μ in length and 70μ in breadth.

The organisms suddenly disappeared from the stools without any treatment. Both patients were very anaemic and had diarrhoea.

S. R. D.

SPRUE.

CANTLIE (James). **Some Recent Observations on Sprue.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1296-1297.

The author draws attention to the following symptoms occurring in the course of sprue.

1. Temperature. A continued fever almost certainly indicates the last and fatal stage of the disease.

2. Neuralgia of the anus may occur even without any lesion such as fissure, and is a late symptom.

3. Tetany. During the last 18 months the author has seen 6 cases of muscular spasm in sprue, accompanied with marked anaemia. These spasms may be very severe, accompanied even by unconsciousness and fever as high as 103° F. These attacks do not imply a fatal issue of the malady.

4. Prolapse of the sigmoid into the rectum may occur, but is uncommon.

With regard to treatment, the author lauds collosol argentum (CROOKES) as a drug.

With regard to diet the meat treatment is recommended, or alternating diets of meat, milk, and farinaceous foods, for periods of three days; on no account should such diets be combined. Strawberries, he states, still hold their position as a curative agent and, failing these, ripe raw gooseberries or the juice of blackberries.

S. R. D.

St. Leede (C.). **Ein Fall von Sprue durch Erdbeeren gebessert.** [A Case of Sprue benefited by a Diet of Strawberries.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1913. Oct. 8. Vol. 75. No. 3. pp. 578-586.

The author observes that there is very little to be found on the subject of sprue in German medical literature, and that his countrymen at home have but few opportunities of becoming acquainted with the disease. For this reason he thinks the account of a case may be interesting.

The patient was a married woman of middle age, who returned to the United States in 1906, after a long residence in Porto Rico. The disease first showed itself in painful aphthous ulceration of the tongue and buccal mucous membrane. This seemed to be made worse by the eating of fruit, particularly strawberries. In March, 1912, considerable looseness of the bowels supervened without any obvious exciting cause. Between early morning and 2 p.m. as many as 10 stools of the characteristic type would be passed, but this symptom never disturbed the patient during the hours of sleep. There was no particular abdominal pain, but considerable discomfort from flatulence and borborygmi. Gradually the general health of the patient became impaired, with loss of flesh and spirits, and much coldness of the extremities. At this stage the patient sought the author's advice, and was admitted to a private hospital. The blood on examination showed normal corpuscular elements, but the haemoglobin was 50 per cent. below the normal by Sahli's haemoglobinometer. The gastric juice, after a test meal, showed 2·8 per mille of free hydrochloric acid, and a total acidity of 5·2. As the patient declared that the eating of strawberries and other fruit had always aggravated her symptoms, the medical treatment of the condition was initiated by recourse to other remedies, like bismuth, opium, and castor oil. No benefit being obtained, an exclusive milk diet was tried, with confinement to bed. This reduced the number of stools to one per diem, but a troublesome constipation supervened which required the use of enemas. Tannin injections into the lower bowel caused insupportable pain. Finally recourse was had to a diet of strawberries, which happened to be in season, beginning with only two at a time, and the quantity being gradually increased. The result was startling. On this diet improvement in every particular rapidly took place. In America strawberries can be had from March to Christmas, so that there was no difficulty in continuing the diet, and the patient was sent to California for that purpose. Though at the time of writing the cure was not complete, the benefit received was so great that the author feels justified in putting the case on record.

Conformably to the experience of other practitioners, it was found that strawberries preserved in any form, either with or without sugar, are not the equivalent of the fresh fruit, suggesting the idea that the beneficial principle is destroyed by heating.

S. R. D.

FILARIASIS.

Low (G. C.) and Others. **Discussion on Filariasis.** (British Medical Association.)—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1298-1300.

In opening the discussion Low reviews the various papers published during the year ending July, 1913, commenting in turn upon the views expressed by the different authors. OUZILLEAU's indictment of *F. volvulus* as a cause of elephantiasis in the Mbomu region of the Congo is not regarded as trustworthy. The results of FÜLLEBORN and BAHR are quoted to emphasize the contradistinction in periodicity between the microfilaria of Samoa, Fiji, etc., and that in the Bismarck Archipelago. FÜLLEBORN and FOLEY have dealt exhaustively with the differences determinable between *Filaria diurna* and *Filaria nocturna.*

The work of LOW, WISE and MINETT upon the diseased conditions produced by *F. bancrofti* makes it clear that the filariae, by damaging the tissues, may allow the ingress of organisms, which in turn set up purulent foci, either localized or diffuse if the main lymphatics are involved. KONDOLEON, ROSANOW, PELLETIER, and MÜLLER propose new operations for elephantiasis, while lymphangioplasty is discredited by MADDEN, IBRAHIM, and FERGUSON. As many of the cases operated upon were non-tropical, it is suggested that the condition is commoner in temperate zones than was supposed, and has, of course, other cause than filaria.

Low points out that the geographical distribution of *Filaria bancrofti* is often peculiarly and inexplicably unequal; thus in Grenada with apparently ideal conditions of climate and intermediaries, the infection is practically non-existent. The absence of hyperfilariation is also a problem which calls for solution, and it is suggested that possibly there is a struggle for existence even among the filariae. Another problem is the ultimate end of the embryos which must constantly be dying in the blood stream.

Further work is needed on the pathology and pathological anatomy of the diseased conditions due to *F. bancrofti.* BAHR has pointed out that destruction and fibrosis due to the worms in the lymphatic glands must lead to an increased difficulty in the passage of the lymph through those affected, and Low has shown how easy is the blockage of the intra-abdominal glands which drain the lymph from the lower limbs.

A number of problems as regards *F. loa* are restated. Why are embryos absent from the blood in some cases where adult females are known to be present in the tissues? In what way do the worms induce Calabar swellings? As *F. loa* does not seem to produce abcesses, when it dies, what becomes of it?

The whole subject of helminthic eosinophilia is regarded as an attractive piece of research work.

Dr. DUNCAN WHYTE (Swatow, China) endorsed Dr. Low's statement regarding the absence of hyperfilariation. In three filariasis patients from whom elephantiasis scroti had been surgically removed, the embryos could be found in the peripheral blood for from a week to ten days. A verdict of "not proven" should be brought in on the question of the pathogenicity of *F. bancrofti.* The arguments used were of the

same kind as those directed to the incrimination of *F. perstans* as the cause of sleeping sickness.

Dr. R. Fleming Jones remarked that the patchy distribution of elephantiasis was well illustrated in British New Guinea. Whereas he found there an average of seven per cent. of infection with microfilariae, nearly all his cases of elephantiasis came from one small district. This suggested symbiosis.

Dr. Bahr demonstrated the specimens collected by him in Fiji. Adult filariae, he stated, were common in the lymphatic glands in Fiji, and induced (1) giant cell formation, and (2) fibrosis. They acted upon the tissues by their presence and by their excreta and toxins. On death they became calcified and resulted in (1) mechanical blocking, (2) fibrosis, and (3) endothelial proliferation of the lymphatic vessels. Filarial abcesses were due primarily to the filaria, secondarily to streptococci and staphylococci. In lymphangitis the lymph was generally sterile. The lack of periodicity in the blood of man of the Fiji filaria seemed to be a distinct adaption to the habits of its favourite intermediary, *Stegomyia pseudo-scutellaris.* Lymphangitis came on periodically, because [hypothetically] the filaria had definite breeding seasons and the emission of microfilariae only took place at definite periods, causing the lymphangitis. Microfilariae disappeared from the blood after an attack of lymphangitis.

Prof. Wasielewski suggested that the lesions of filariasis might be explained if it was supposed that the filariae produced a chemical effect.

R. T. Leiper.

Fülleborn. **Die Filarien des Menschen.**—*Handbuch der pathogenen Mikroorganismen.* (Kolle & Wassermann.) 1913. 2nd edit. Vol. 8. pp. 185-344. With 6 plates and 41 text-figs.

An excellent account of the human blood filariae. Everything of any importance that has been done on the subject is mentioned. Many diagrams, photographs and coloured plates add greatly to the value of the work, as does also the very full and accurate account of the literature. The monograph takes up 159 pages. It may confidently be stated that it will form the standard work on human filariasis for many a day to come, and at the same time it will prove of inestimable value as a work of reference to all workers on this special branch of tropical medicine.

G. C. Low.

Marotte & Morvan. **Filariose et Natalité.**—*Arch. de Parasitologie.* 1913. July 10. Vol. 16. No. 2. pp. 306-313.

The data for the above paper were obtained from a battalion of Senegalese troops in Algiers. [See also this *Bulletin,* vol. 2, p. 87.] Some more statistics are now given. For example, as a rule, men have been found to be more often infected than women, 29·28 per cent. in the case of single men and 31·52 per cent. in the married, figures appreciably equal. Of 122 children examined only one was found infected, a girl of four years. The father and mother of this child were filariated. Of 354 households examined 127 were found to contain

carriers of microfilaria. In 25 of these both husband and wife were filariated; in the other 102 one only, namely the man in 86, the female in 16.

The extreme rarity of the disease in children up to 13 is interesting, though the authors do not believe it can be attributable to a natural immunity due to age or to a very long incubation period; the cause of this peculiarity is still uncertain.

The species of filaria encountered were *Filaria bancrofti*, *F. perstans* and *F. loa*. A small and large variety of *perstans* is described.

[As already pointed out in this *Bulletin* (vol. 2, p. 88) the smallness of the figures employed in many instances render the percentages misleading.]

G. C. L.

MOUCHET (R.). **Notes Anatomiques et Médicales sur la Pathologie du Moyen Congo.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Vol. 17. No. 19. pp. 657-669. [Filariasis. pp. 667-668.]

Embryonic forms of *Filaria diurna* and *perstans* are very abundant in the regions around Leopoldville in the Middle Congo, but the author states that he has never found *Filaria bancrofti*.

The embryos found in the peripheral blood are very abundant in the hot hours of the day, and apparently are found more frequently during the wet season than the dry. Elephantiasis is rare, two cases only having been seen, one of the scrotum and one of the vulva.

Onchocerca volvulus is frequently seen, in some cases there being as many as 12-15 small tumours present. These are generally situated about the iliac crests.

G. C. L.

MAROTTE & MORVAN. **L'Eosinophilie dans la Filariose.**—*Compt. Rend. Soc. Biol.* 1913. Oct. 24. Vol. 75. No. 29. pp. 241-243.

The subject of eosinophilia in filariasis was studied by the authors in a battalion of Senegalese natives in Algiers [see this *Bulletin*, vol. 2, p. 87] comprising 1,339 individuals—811 men, 386 women, and 142 children. More than three thousand stained slides were examined, and the results of these are given in the following table :—

Among	3	carrying	embryos of	*F. loa*	2	cases of	eosinophilia.
,,	88	,,	,,	,, *F. bancrofti*	0	,,	,,
,,	208	,,	,,	,, *F. perstans;*	1	case of	,,
,,	14	,,	,,	,, different kinds	0	cases of	,,

The absence of eosinophilia in so many of their cases is pointed out and is specially commented upon.

[Such a condition has already been described by Low in natives of Uganda; many of these, although harbouring many intestinal as well as filarial parasites, showing no eosinophilia (see this *Bulletin*, vol. 1, p. 108.)]

G. C. L.

FILARIA LOA.

BRUNETIÈRE. **La Filaire de l'Oeil (*Filaria loa*) peut-elle déterminer des Complications cérébrales?**—*Gaz. Hebdomadaire des Sci. Méd. de Bordeaux.* 1913. July 27. Vol. 34. No. 30. pp. 351-353.

In 1911 two cases of *Filaria loa* infection were presented to the

French Ophthalmological Society. As the author points out, the ocular symptoms produced by this parasite have often been studied; he now asks, can cerebral complications be produced by it as well? The history of a case is given. The patient, thirty years of age, with no specific history, developed a well-marked right-sided hemiplegia. This was supposed at first to be due to a cysticercus cyst in the brain, but finally this idea was abandoned. Two further hypotheses were next advanced, viz., endocarditis and filariasis. The author admits that the patient was suffering from a mitral lesion, but he is not inclined to attribute the embolus to it. He suggests rather that the condition was caused by an adult filaria or probably by a mass of microfilariae occluding some of the terminal ramifications of the left middle cerebral artery in the Sylvian fissure.

[The evidence that the *Filaria loa* was the cause of the condition in this instance is not very striking, but at the same time the possibility of cerebral symptoms must be kept in mind. The reviewer once saw a case of *Filaria loa* infection who presented headaches and other cerebral disturbances for which no other definite cause could be assigned.]

G. C. L.

ROGERS (W.). **A Note on a Case of** *Loa Loa.—Annals Trop. Med. & Parasitology.* 1913. Nov. 7. Vol. 7. No. 3B. pp. 363-365.

From May, 1906 to June, 1907, Dr. Rogers resided in Southern Nigeria. From July to November, 1907, while living in Wales, he had evanescent thickening of one or other leg and some oedema about the ankle which lasted a day or two. Various diagnoses were made, including rheumatism, cellulitis, erythema nodosum, etc. From November, 1907, to December 1908, he again lived in Africa (Lagos Protectorate), but finally settled in Wales in March, 1909. In the late summer of that year fugitive swellings appeared in various parts of the body, generally in the neighbourhood of joints. They were painless, but associated with stiffness and, strangely enough, were even now not diagnosed. In November, 1909, a *Filaria loa* crossed the bridge of the nose, and from that time onward signs of the presence of the worm or worms have been frequent. Sometimes the Calabar swellings were localized, but later there was a tendency for them to involve a greater part of the circumference of one or other of the limbs.

When a worm appeared on the face, it generally made its way towards one or other eye; then it usually made one or two tours round the eye, either in the lid or in the ocular conjunctiva and then crossed the bridge of the nose to the other eye. While in this vicinity it was always visible under the skin. After visiting the eye sometimes the parasite wandered over the scalp, its curve being easily traceable by the tender area and later localised swelling. The presence of the worm about the eye was always accompanied by a pricking, boring pain; when under the conjunctiva it caused severe conjunctivitis with redness, dilated vessels, feeling of grit, headache, etc.

Towards the end of 1912 a worm was removed from under the conjunctiva—an immature female; after this the usual symptoms disappeared for some time, but later Calabar swellings again developed.

Blood examination showed an eosinophilia of 3-5 per cent., but as the author also suffered from bilharziasis, it is difficult to say to which

of the parasites this was due. Later a second worm, a mature female, was removed.

[A case such as this should be well worth following up closely, and as the life history of the parasite is a long one, symptoms may be expected for years to come. It is unfortunate that no record appears to have been kept of the presence or absence of embryonic forms in the peripheral blood. Such an examination might even now be made with advantage.]

G. C. L.

SCHULTZ (Nadine). **Ein Fall von menschlicher Filaria-Infektion.** [A Case of Human Filaria Infection.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Nov. 15. Vol. 71. No. 5-7. pp. 410-413. With 1 text-fig.

A case of *Filaria loa* infection, seen in St. Petersburg, is described. The patient, it is stated, lived in the South [? where] for one month. Eight months after a filaria appeared in the right eye under the conjunctiva. Apparently also, as far as one can judge from the context of the paper, embryos were present in the peripheral blood. A description of these is given, but there is nothing new in that nor in the other parts of the paper.

[The paper is valueless because no details are given as to where the patient lived when in the Tropics, nor as to whether the filaria in the blood had any periodicity, nor as to the many other points required for accurate diagnosis of such parasites. The literature also is incomplete and worthless. The author has evidently very little experience or knowledge of the subject of filariasis.]

G. C. L.

ONCHOCERCIASIS.

FÜLLEBORN & SIMON. **Untersuchungen über das Vorkommen der Larven von *Onchocerca volvulus* in Lymphdrüsen und in der Zirkulation.** [Researches on the Presence of the Larvae of *Onchocerca volvulus* in the Lymph Glands and Circulation.]—i. *Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 843-844; and ii. *Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Nov. Vol. 17. *Beiheft* 9. pp. 5-18 (501-514). With 2 plates.

i. One of the authors (Simon) found filarial embryos in the inguinal lymph glands and blood of a native suffering from volvulus tumours near the right superior iliac spine. These were large and unsheathed, and he believed that they might represent the embryonic forms of *Onchocerca volvulus*. Fülleborn examined the material and could make out no difference between specimens from volvulus tumours and those from the glands and blood preparations. On the other hand they differed characteristically from the embryos of *loa*, *perstans* and *demarquayi*.

OUZILLEAU [see this *Bulletin*, vol. 1, p. 419] has described similar embryonic filariae in lymph glands of patients suffering from *O. volvulus*. Simon suggests that when such embryonic forms are found in blood smears, it is only in specimens where much pressure has been employed in squeezing out the blood, a considerable amount of lymph having exuded as well. In preparations made in the ordinary manner they are not seen.

ii.—In this paper the authors expand their observations, a series of accurate measurements and comparisons of measurements with the known embryonic filariae being given. The material was collected by Simon from a native of the English Gold Coast, forty-five years of age, who was operated upon for a femoral hernia. The lymph glands were obtained during the operation and, as already stated, were found to contain filarial embryos. Though ordinary blood preparations taken at different hours of the day and night showed no embryos, Simon found that if he squeezed the finger powerfully in making the specimens, non-sheathed embryos of a size comparable to *bancrofti* embryos appeared. These specimens and the other material have now been carefully examined and measured by Fülleborn, who has studied the percentage results of the different anatomical fixed points and has compared them with those of *F. bancrofti* and *F. loa* embryos. The results of these measurements are easily seen in the subjoined table.

Percentage results of the anatomical fixed points in relation to the Length (Average.)

		Nerve Ring.	G¹ Cell.	End of the last Tail cell.	Total Length in μ
1. *Microfilaria volvulus* from the uterus of the female.	(*a*) in wet Formalin preparations	—	—	—	298·0
	(*b*) in dry preparations from Formalin material.....	24·2	69·51	95·61	269·2
2. Microfilariae from the Lymph-glands of *volvulus* carriers	(*a*) in wet Formalin preparations	—	—	—	313·5
	(*b*) in dry preparations from Formalin material.....	23·55	69·24	95·52	297·5
	(*c*) in dry preparations from fresh material	24·3	68·9	95·5	224·5
3. Microfilariae from blood preparations of *volvulus* carriers.	(*a*) in wet Formalin preparations	—	—	—	—
	(*b*) in dry preparations from Formalin material.....	—	—	—	—
	(*c*) in dry preparations from fresh material	23·77	69·6	96·3	274·3
	(*c*) in dry preparation from acetic acid blood centrifugate	23·17	69·9	95·77	258·2

Comparing the measurements in this table with the similar ones of the embryos of *Filaria bancrofti* and *F. loa* the author draws up the following table:—

	Nerve ring.	G¹ cell.	End of the last tail cells.
Mf. bancrofti ..	19·6	70·6	95·1
Mf. loa ..	21·6	68·6	Quite or nearly quite at the end.
Mf. volvulus ..	24.2	69·51	95·61

The different possibilities of what these embryos may be is next discussed, Fülleborn rightly claiming that the absence of a sheath in well-stained haematoxylin specimens clearly differentiates them from *bancrofti* and *loa* larvae. The sharp-pointed tail and general size likewise show they are not *F. perstans.*

[From Fülleborn's measurements it is at once seen that the embryos found in the lymph glands and blood of the native infected with *volvulus* cysts closely correspond with—or one might say, are the same as—the real embryos of *O. volvulus.* These observations confirm Ouzilleau's statements, but even granting that embryos are present in the glands it does not follow that they can produce elephantiasis as the latter claims.]

G. C. L.

Rodenwaldt (E.). **Eine neue Mikrofilarie des Menschen.** [A New Human Microfilaria.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Vol. 17. No. 23. p. 843.

In a native of Bassari, North Togo, in whose blood numerous *Filaria perstans* embryos were present, the author found another filarial embryo which, he believes, presents differences from both those of *F. bancrofti* and *F. loa.* The new embryos showed no periodicity, while in the finer morphology of their different anatomical points they seemed to be midway between the two just mentioned. The question as to whether they might be the embryos of *Onchocerca volvulus* is considered, but apparently they are not exactly similar to such embryos removed from volvulus tumours by puncture. A further development might, of course, occur later in the blood, as the author suggests.

[Until more details, measurements, anatomy, etc., are forthcoming, one can say nothing as to what this embryonic filaria may be.]

G. C. L.

Filariasis of Animals.

Pricolo (Antonio). **Sur la Filaire Hématique du Chameau.**—*Centralbl. f. Bakt.* 1 Abt. Orig. 1913. Vol. 71. Nos. 2-3. pp. 199-200.

The author has followed up his studies on the larval filariae found in the blood of camels by himself in Tripoli [see this *Bulletin*, vol. 1, p. 425.] Adult parasites, male and female, have now been found by him twice in the blood vessels of the lungs, and six times in those of the testicles. In the lungs, where the parasites were found, calcareous nodules also occurred, but, as these were also found in the walls of the intestines and in the liver, the author is doubtful if they are connected in any way with the filariae. In the testicles sclerotic hypertrophic changes were present. A description of the adults is next given and, the name of *Filaria haematica cameli* is proposed for them, the author believing that it has nothing in common with another worm which has been encountered in dromedaries in the colony of Eritrea, in the tissues of the neck. The female measures 22 cm. in length and 666μ in breadth. The eggs are oval in contour and contain embryos in different degrees of development, they measure 32 by 12–15μ. The male in appearance is like fine catgut, measuring 8-12 cm. in length, with a breadth of 300μ. The parasites, as already stated, are found in the

blood vessels where, their presence may set up aneurismal dilatations. Other morbid conditions may be caused by them. No further description of the embryos is given.

G. C. L.

STEFKO (W.). **La Filariose des Oiseaux de la Russie Centrale.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 592-594.

MARZINOVSKY was the first to discover Microfilaria in birds in Central Russia (*Corvus cornix L.*, *C. moned.*, *L.*, and *Luscina philomelae*).

The investigations which form the subject of the present article concern chiefly *Corvus frug. L.* (a bird wintering sometimes in Northern Africa). 42·1 per cent. of *C. frug.* were found to be infected. The microfilariae were found only in the blood of old birds which had migrated, not in young birds indigenous to the country. Similar observations were made on *Corvus moned.* and *Garrulus glandarius.*

[The fact that only old birds which had migrated showed filarial infection indicates that the parasites must be acquired in Northern Africa.]

G. C. L.

ELEPHANTIASIS.

TAYLOR (Adrian S.). **Elephantiasis of Scrotum.**—*China Med. Jl.* 1913. Nov. Vol. 27. No. 6. pp. 388-390. With 3 text figs.

The author thinks that the details of the operation for elephantiasis scroti as given in books of tropical medicine are too scanty. As he also believes that a method used by himself is superior to that described by MANSON and CASTELLANI and CHALMERS, he gives a description of it. This, briefly, is as follows :—

After the part has been sterilised a long rubber tube is wound round the base of the tumour and is held there and prevented from slipping by towel clamps—one anteriorly in the pubic region, one in front of the anus, and one each side, all, of course, being clamped below the tourniquet. This method is preferred to the usual one of the figure of eight round the waist.

A long sagittal incision is now made from a point on the pubis in good skin, perpendicularly downward through the preputial opening along the median raphe to a point in good skin in the perineum in front of the anus. The penis is then dissected out. After this is done the tumour is boldly disected and each half laid over on its respective side. This allows of the testicles being approached from the median aspect instead of by the usually recommended primary perpendicular incisions, their position nearer the median line rendering this a useful procedure. They and the cords are then carefully isolated, any hydroceles present being attended to, and are finally turned up with the penis till the tumour is removed.

Working from within outwards the elephantoid tissue is cut away from the perineum till the skin is reached, and as soon as the tumour is cleared away from the mid-line—from the pubis anteriorily to the anus posteriorly—the skin is cut through, this releasing the whole tumour mass.

As soon as bleeding is stopped, as much of the preputial mucous membrane as necessary is turned back and used for a part of the covering of the penis.

The testicles are placed in as normal position as possible, and covered over with the flaps saved from the sides of the tumour. The everted mucous membrane is stitched to the edges of the skin and the incision is then closed horizontally across the pubic region down to the penis and from here downward vertically, making a T shaped closure. It is surprising how normal the parts appear after the operation.

The author claims that his method has the following advantages :

(1) a minimum amount of work is done from the external surface of the tumour inwards and the danger of infection is thus lessened; (2) the heavy tumour has to be lifted very little, and as it is cut in two it falls apart and rests between the patient's legs on the table; (3) the mass is gradually liberated by working from the mid-line externally and from before backwards, with the tissues to be cut in plain sight, so that if necessary every bit of tissue may be clamped before cutting, and thus loss of blood avoided; (4) the testicles are easily reached by blunt dissection, with little danger of injury, and the cords can easily be isolated as high up as desired.

G. C. L.

OUZILLEAU. **L'Eléphantiasis et les Filarioses dans le M'Bomou (Haut-Oubangui). Rôle de la** *Filaria volvulus.*—*Ann. d'Hyg. et Méd. Colon.* 1913. July-Aug.-Sept. Vol. 16. No. 3. pp. 688-709.

The author continues his paper on elephantiasis and filariasis in the M'Bomou district [see this *Bulletin*, vol. 2, p. 426.] He returns to the suggestion that the *Onchocerca volvulus* may give rise to elephantiasis. He does not, however, produce any further evidence how a parasite living in cysts in the subcutaneous tissues could produce the train of symptoms seen in this disease.

[The idea of *Onchocerca volvulus* having anything to do with the etiology of elephantiasis has already been criticised, *loc. cit.* vol. 1, p. 419.]

G. C. L.

BRANCH (Edmund R.). **Salvarsan in Filariasis.**—*Jl. Trop. Med. & Hyg.* 1913. Dec. 1. Vol. 16. No. 23. pp. 364-365. With 1 text-fig.

From an experience of nineteen cases of filariasis [variety not stated] treated by salvarsan, the author has noted: (1) a diminution of the febrile attacks; (2) a healing of ulcers of a chronic and indolent nature; (3) a reduction in the size of some elephantoid limbs; and (4) a general improvement in the health of the patients.

As many of these cases had also suffered from syphilis, the author rightly states that the remarkable improvement in their health could not be attributed only or chiefly to the absence of filarial attacks; but, in other instances, cases uncomplicated by syphilis showed a marked improvement in their health after salvarsan treatment.

[Though not definitely stated, the context of the paper suggests that the author is dealing with cases of elephantiasis and the febrile attacks (filarial lymphangitis or elephantoid fever) which accompany that condition. It is possible and indeed probable that salvarsan, which after all is an arsenical, may benefit this condition, but as to the drug killing the adult filariae, where those are alive and actively breeding in ordinary cases of filariasis there is no proof. Most workers who have tried it find that it does not do so. The author's statement that embryos disappeared from the blood after treatment with salvarsan requires explanation, because in the class of case he was dealing with larval forms of filariae are conspicuous by their absence.]

G. C. L.

CHOLERA.

KOBLER (G.). **Zur Frage der Choleraübertragung durch Nahrungsmittel.** [The Part played by Food in the Spread of Cholera.]—*Wien. Med. Wochenschr.* 1913. Sept. 20. Vol. 63. No. 39. pp. 2493-2496.

The International Sanitary Convention of Dresden, 1893, attached little importance to the risk of food-stuffs in spreading cholera. France in the anti-cholera campaign of 1911 permitted the free entrance of fruit and vegetables. Roumania forbade the entrance of fruit and milk from Turkey during the last epidemic. Servia forbade grapes. The Bosnia-Herzogovina Authorities (1911) forbade the importation of fruit and vegetables, because of the opinion of ROUX that, though these things were not very dangerous, still they were not entirely free from danger, and also because GAFFKY had shown that cholera vibrios remained alive and virulent on fruit for four to five days. ZABOLOTNY showed that ices had caused cholera in several cases in St. Petersburg (1908–1909).

The author, on reviewing all the evidence, considers that where an interval of several days between export from a cholera district and consumption in a new district occurs the danger is negligible, but where the interval of time is small a real danger does exist. He believes that States immediately neighbouring infected ones ought to adopt restrictive measures in special cases. Mussels have been shown to be able to convey cholera (RAUCHETT, Milan). Milk, butter, vegetables and fruits are foods which should be carefully handled and distributed, especially within short range of their origin. POLLAK showed cholera vibrios remained alive on apples up to the 16th day. He further showed that when putrefactive organisms appeared on fruits the cholera vibrios were rapidly destroyed.

W. J. Penfold.

EMMERICH (Rudolf). **Zur Aetiologie der Cholera asiatica.**—[The Etiology of Cholera.]—*Jl. of State Med.* 1913. Oct. Vol. 21. No. 10. pp. 604-609. With Discussion, pp. 609-611.

The author discusses anew the theory that nitrites and nitrous acid are the toxic agents in cholera. He believes the latter is toxic directly and also indirectly, oxidising the amino groups of the living protein. This latter action affects especially the epithelial cells of the intestines. In response to the acute irritation of this epithelium, a large amount of alkaline fluid is poured into the gut, which neutralizes the free nitrous acid. Nitrous acid is present in the vomit and stools and urine in cholera, but not in normal control stools. The spasms of muscle are alleged to be due to liberation of nitrous acid from nitrites by the lactic acid present in muscle.

The oxidation disturbances caused by the nitrites are said by the author to be the cause of acidosis, cyanosis and hypothermia. Free nitrous acid is alleged to be produced in the kidney, which is thereby damaged. Secondary intoxications, the author believes, follow the injury of the gut, these toxic agents being indol, nitroso-indol, lactic acid, oxyacids, and other substances.

Emmerich draws attention to the facts (1) that cholera toxin and endotoxin when introduced into the stomach and intestine even in great quantity are harmless, (2) the intestinal mucus is acid after death in 50 per cent. of cholera cases.

He discusses the opposition of METSCHNIKOFF and CHONKEWITCH to his theory. They cited BERTHELOT as having shown that rabbit milk was free from nitrates. From this they concluded there was no source of nitrite available. Emmerich, however, cites RATTENFUSSER as having disproved this, and having shown that rabbit milk contains a considerable quantity of nitrate. Human milk, on the other hand, is nitrate-free, and Emmerich points out that breast-fed children are likewise free.

Professor SCHELLER, of Breslau, attacked the hypothesis of Emmerich, but none of his points appear entirely new.

W. J. P.

ORTICONI & SARTORY (A.). **Le Choléra.**—*Gaz. des Hôpit. Civils et Militaires.* 1913. Oct. 11. Vol. 86. No. 116. pp. 1805-1813 & Oct. 18. No. 119. pp. 1853-1859.

Il Colera.—*Riforma Medica.* 1913. Nov. 5. Vol. 29. No. 46. pp. 1280-1281.

A general review of the subject, no fresh work being communicated. It is well-balanced, but contains nothing new. It is surprising to find no mention of the work of ROGERS in the section dealing with treatment.

W. J. P.

GOÉRÉ (J.). **Le Choléra à Ferryville (Tunisie) en 1911. Étude Clinique et Bactériologique.**—*Arch. de Méd. et Pharm. Navales.* 1913. Sept. Vol. 100. No. 9. pp. 207-215; and Oct. No. 10. pp. 266-278.

The paper contains an account of three cases of cholera. The first patient was in hospital suffering from albuminuria when he was attacked by cholera; during the choleraic diarrhoea he was free from albuminuria which, however, returned when convalescence from cholera was established. The second and third cases presented no noteworthy features.

The injection of normal saline was used as the principal treatment when the pulse was feeble or temperature fell. It appeared to give good results; alcohol, friction and lactic acid were also used. Fourteen per cent. of carriers were found amongst the people who had been in contact with the cholera cases. The carriers were treated with potassium permanganate with apparently good results. None gave a positive agglutination test.

None of the cases could be traced to contaminated water, but their infection appeared rather to be due to direct contact with other cases. The methods of isolation were the usual ones, and the vibrios found were of the classical type of KOCH. The author found that patients' serum taken during the attack in no single case agglutinated the specific organism. Agglutinins first appeared in the serum during the four or five days following recovery; they disappeared almost

entirely after two months, and in no case was the titre of the serum ever higher than $\frac{1}{500}$. The agglutination was most marked with the strain of organism isolated from the patient whose serum was under examination.

In no case did the serum of any healthy carrier agglutinate the bacillus, nor did the serum of any one of ten healthy control individuals who were not carriers. All the vibrios isolated agglutinated on first trial, but the author describes two strains (isolated in Marseilles), which did not agglutinate on isolation, but did subsequently after five and six subcultures on agar respectively. He also describes two strains isolated from one loop of bowel, which agreed with each other in all points except that one was agglutinable and the other not. The action of alcohol and acids on the strains isolated was tested, when it was found that 5 c.c. of vinegar per litre sterilized water containing the cholera germ after four hours, and 10 c.c. per litre after twenty-five minutes. He recommends this for use in times of epidemics.

W. J. P.

GALLAS. **Le Choléra dans l'Inde française.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.* 1913. July-Aug.-Sept. Vol. 16. No. 3. pp. 767-776.

The seasonal prevalence of cholera in Pondicherry and Karika is described. It is currently believed amongst the natives that cholera appears with the first rains and stops when the dry season is well established. The dry season lasts from January to July, when the first rains appear; heavy autumn rains commence in the second fortnight of October and last till the end of November. In 1910 and 1911 the curves of rainfall and external temperature varied fairly closely with the cholera incidence. The dry and warm months (March to June) show little cholera. In October, 1910, however, when the rains were very heavy, the epidemic stopped, while in 1911, with moderate rains, the epidemic continued. Gallas believes this to be due to the effective cleansing influence of very heavy rains, while moderate rain encourages the growth of the organisms outside the body.

The occurrence of epidemic outbreaks is due to (*a*) bad hygienic conditions, (*b*) diarrhoea due to sudden fall of temperature, occasioned by the rains, (*c*) the formation of pools of water, which are excellent culture media for the vibrios. Water-borne epidemics have been the exception; the majority of cases have been more or less isolated; a direct contact with patients and carriers would appear to be the principal cause of dissemination of the disease.

Treatment in the early stage was effective, but in the algid stage was never of any use in the case of natives, all dying who got into this condition. Caffeine, camphor oil, sparteine, normal and hypertonic salines, and permanganate of soda were all used.

The fatalism of the natives and their social habits render it difficult to apply preventive measures. For two years Pondicherry has had a good water supply, and in the town itself the cholera incidence has recently been almost nil. Notification is not carried out in many cases

though it is legally required. The natives object to the removal of infected cases to hospital. Disinfectants are supplied at trifling cost to the public.

W. J. P.

ZIROLIA (G.). **Ueber einen aus Brunnenwasser gezüchteten Cholera-vibrio, Ursache einer Choleraepidemie.** [On a Cholera Vibrio cultivated from Spring Water, the cause of a Cholera Epidemic.] —*Hygienische Rundschau.* 1913. Sept. 15. Vol. 23. No. 18. pp. 1081-1085.

In the summer of 1911, in the province of Genoa, a cholera epidemic occurred. During this epidemic a small town, Sori, seventeen kilometres from Genoa, became suddenly infected on the 14th of August, eight cases occurring together. The water was suspected as a cause. During the summer the water supply of Sori is almost entirely derived from one spring. This supply was stopped on the notification of the cases. By the 24th of August there were thirty-one cases. The spring in question is quite close to a small river running through the town, and it was believed to have been contaminated from the river, in which, probably, infected clothes had been washed.

This water was examined bacteriologically. It was inoculated into peptone water, and after ten hours alkaline agar plates were made; in this way the cholera vibrio was recovered and identified from quantities of 2 c.c. upwards. The vibrio gave all the typical cholera reactions and agglutinated to $\frac{1}{3000}$ with a specific serum having a titre of $\frac{1}{6000}$. Cholera vibrios isolated from the patients could not be distinguished from it. The infected water was allowed to stand in the laboratory at a temperature of 16°–22° C. and showed the vibrios up to the 62nd day. Zirolia found the vibrio's power of being agglutinated was greater after remaining in the water sixty-two days; the virulence under the same conditions had diminished.

W. J. P.

v. KONSCHEGG (A.) & WELTMANN (O.). **Ueber einen Fall von choleraähnlicher Erkrankung, hevorgerufen durch einen pathogenen Vibrio.** [A case clinically resembling Cholera, caused by a Pathogenic Vibrio.]—*Oesterreichische Sanitätswesen.* 1913. Oct. 16. Vol. 25. No. 42. pp. 1401-1406.

The patient was admitted to hospital in Vienna on suspicion of cholera on the 8th June, 1911. The attack commenced six days before admission. During this time vomiting occurred about thrice daily, and greenish liquid stools were passed two or three times a day. Peptone water cultures of the stools showed, after six hours, a typical scum containing vibrios only, and a marked cholera red reaction was obtainable at this time. The fresh strain and the strain after several subcultures on agar were tested against a specific serum, but did not agglutinate. The strain was not lysed *in vivo* by a specific cholera serum. It was morphologically identical with the typical cholera vibrio, and it agreed with the latter in all the cultural and biochemical tests. The patient's serum agglutinated the strain fully

in $\frac{1}{400}$ dilution, while normal serum agglutinated it only slightly in $\frac{1}{50}$ dilution, so that it probably was pathogenic in the patient.

A specific serum was made by injecting the strain into rabbits; the serum so obtained had a titre of $\frac{1}{2000}$. The serum was tested against ten other strains of well known vibrios, two being genuine cholera strains, and, with the exception of Deneke's vibrios, none of these agglutinated in $\frac{1}{10}$ dilution; even Deneke's vibrio agglutinated in dilutions of $\frac{1}{100}$ slightly, but not higher. The authors, therefore, come to the conclusion that the organism is not closely related to any hitherto described.

W. J. P.

GREIG (E. D. W.). **Preliminary Note on the Occurrence of the Comma bacillus in the Urine of Cases of Cholera.**—*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 90-91.

The author examined the urine in fifty-five cases of cholera for the comma bacillus, and found it in eight of the cases. The organism was fully identified by morphological, cultural, and serum tests. Up to the present no systematic examination of the urine has been made in cholera cases for the specific organism, so that this is a new observation, and suggests the disease is in many cases of a septicaemic nature.

W. J. P.

GREIG (E. D. W.). **An Investigation on the Occurrence of the Cholera Vibrio in the Biliary Passages.**—*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 44-58. With 3 plates.

The author reviews the literature of the subject briefly, from which it appears that the cholera vibrio occurs in the bile in about 40 to 70 per cent. of the cases.

Greig examined the bile in 271 fatal cases, and found the cholera organism present in 80, and that in 12 of these pathological lesions of the gall bladder were present. The cholera organism grows well in the bile, and its entrance into the gall bladder is of great importance from the carrier standpoint.

The technique pursued does not call for remark. A table dealing with the 271 cases gives date of death, pathological condition of the gall bladder and the presence of the vibrio in the bile alone or in mixed culture. If the vibrio was found it was usually in pure culture. The mode of entrance of the germ into the gall bladder is discussed, but no definite evidence on the point produced. The fact that cholera germs may be found in the blood and lung suggests the possibility of its being deposited in the gall bladder from the blood. The pathological changes in the wall of the gall bladder include the casting off of portions of the mucous membrane, and cellular increase in the sub-mucous layer where vibrios may be also microscopically demonstrated.

W. J. P.

WELCKER (A.). i. **Cholera- und Typhusgangrän. Die symmetrische Gangrän im Balkankriege kein Frostschaden.** [Cholera and Typhoid Gangrene.]—*Zentralbl. f. Chirurgie.* 1913. Oct. 18. Vol. 40. No. 42. pp. 1625-1628.

ii. **Nachtrag zur "Cholera- und Typhusgangrän, u. s. w."** *Ibid.* Nov. 15. No. 46. pp. 1769-1773. With 6 figs.

i. The communication is of a preliminary character. The author was with the Bulgarian forces during the Balkan War. He saw a large number of cases of gangrene, and from a consideration of 115, carefully investigated, he concluded that cholera was an important exciting cause. Eighty of these 115, 7 to 17 days before the onset of gangrene, suffered from cholera; 20 others gave histories of dysentery or diarrhoea; 5 of the remaining cases gave a history of obscure illness, which the author suggests may have been cholera without diarrhoea.

The author similarly observed in 45 other cases gangrene following typhoid fever. The gangrene occurred two to three weeks after the onset, or not infrequently during the convalescent period. The gangrenes considered were not due to cold.

The medical officers with the Turkish army likewise saw a large number of cases of gangrene, but failed to correlate it with cholera.

The commonest type of cholera gangrene was symmetrical gangrene of both feet. Five cases of gangrene of the fingers and one of the cornea occurred, but it never affected the nose or ears. Two to three per cent. of the cholera survivors suffered from gangrene.

Gangrene, following cholera, has been described in ALLBUTT and ROLLESTON's system of medicine, but it does not seem to have attracted much attention.

ii. The author returns to the question of the causation of this epidemic gangrene. Similar gangrene in the Turkish forces was attributed to cold and frost; he carefully goes over the differential diagnosis, which is as follows:—

SYMMETRICAL GANGRENE.	FROST GANGRENE.
History of cholera, typhoid, or dysentery.	History of cold without a specific infection. Usually follows sleeping on the field or in trenches.
Arises in hospital.	Come for treatment on account of results of cold.
Intense pain as premonitory symptom.	Local anaesthesia.
Limb or finger destroyed in entire thickness, including bone.	Bone not affected. The superficial part affected as in a burn of the 3rd degree.
No vesicles, marked cyanosis, subjective feelings of cold.	Vesicles present on affected part. Anaesthesia of parts proximal to gangrenous portion of limb.
Coldness of part persistent.	On second or third day high fever and signs of local reaction.
Temperature rises on demarcation or secondary infection.	

The diarrhoeal attacks which followed the gangrene in some of Welcker's patients were to be regarded simply as relapses of the initial disease.

W. J. P.

NEWTON (H. Martyn). **Cholera.** *Medical Missions in India.* 1913. Oct. Vol. 19. No. 75. pp. 143–147.

An account of a local cholera epidemic.

Treatment in 12 cases consisted of hypertonic saline given subcutaneously ; of these patients three died. Of 81 cases not so treated, 41 per cent. died. Local prejudice appears to be strong against European methods of prevention and treatment.

W. J. P.

LOGAN (O. T.). **The "Wholesale" Treatment of Cholera.** *China Med. Jl.* 1913. Sept. Vol. 27. No. 5. pp. 302-314. With 5 figs.

Dr. Logan, residing in Changteh, records the "wholesale" treatment he used in a cholera epidemic of 1913.

The epidemic was probably due to the very marked dryness of the season, and to the lowering of the waters of the local river at a time when the Yangtse was relatively high. The author believes that these conditions favoured the growth of the specific organisms. The contamination progressed by water ; all the towns overlooking the river were successively affected. As a preventive method, the author caused a sandwich man to parade the town with instructions as to how one might avoid cholera.

The author discusses native preventive methods and amongst them the chewing of brass cash, this being highly esteemed. The method which he successfully used was that of ROGERS, with hypertonic saline solution ; he obtained a 77 per cent. recovery rate, the same percentage that ROGERS had in India.

The author, concomitantly with the intravenous injections, administered drinks containing one or two grains to the pint of potassium permanganate or, better still, of calcium permanganate.

W. J. P.

LABORATORY AND EXPERIMENTAL.

HOFER (Gustav) & HOVORKA (Jaroslav). **Versuche zur elektiven Ausgestaltung des Dieudonnéschen Choleranährbodens.** [Experiments to Increase the Selective Character of Dieudonné's Medium.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Sept. 27. Vol. 71. No. 1. pp. 103-112.

The authors discuss the laboratory evidence of the selective value of Dieudonné's medium in dealing with natural and artificial cholera stools.

It was shown by LAUBENHEIMER that this medium affected the form and staining of the vibrios, and also diminished their agglutinating power. The authors' results confirm the first two points and tend

to support the third. They show further, from their work at Kirk-Kilisse that *B. pyocyaneus, proteus, faecalis alcaligenes, fluorescens, mesentericus* types, cocci of different sizes and several unnamed bacilli grow on Dieudonné's agar quite well, so that it is by no means strictly selective. With the materials obtained on their expedition they commenced a research with the idea of improving Dieudonné's medium as a selective agent. They found with a proportion of blood to alkali of 1:4 that all the cholera strains grew well, as also a few non-specific vibrios; on the other had, the cocci, coliform organisms, proteus, and paratyphoid B strains, all of which grew on the ordinary Dieudonné's medium, were entirely suppressed.

Efforts were then made by addition of different salts to the media to suppress the non-specific vibrios, but these were without result. It was found, however, by the addition of a little crystal violet, about 5 c.c. of a 1 per cent. solution to 10 c.c. of their modified Dieudonné's agar, that the non-specific vibrios could be suppressed, while all the specific vibrios developed.

W. J. P.

LISTON (Wm. Glen.) **Report of the Bombay Bacteriological Laboratory for the Year 1912.**—39 pp. f'cap. 1913. Bombay: Government Central Press. Price 5 annas, or 6d. [Cholera pp. 23-25.]

The work of this section was carried out by Captain GLOSTER. The cholera-like vibrios which have been isolated and described by various workers are briefly mentioned, and their close association with the specific vibrio is pointed out. In Bombay (1912) vibrios were isolated from the stools of fifteen patients suffering from symptoms of cholera; four of these were foundto be non-agglutinating. These were obtained on the 2nd, 3rd, 8th and 10th days respectively of the patient's illness. The behaviour of the serum of these patients to the vibrios isolated in the respectivecases and to the typical cholera vibrio is discussed, but not in detail. From wells, a tank and sewage similar non-agglutinating vibrios were obtained which showed no constant cultural or morphological differences from true cholera. All the non-agglutinating vibrios were pathogenic for the guinea pig except one. The non-agglutinaters were more actively haemolytic to goats' red cells than the agglutinaters, while against human cells they were both actively haemolytic. Complement fixation as far as it was tested separated the agglutinaters from the non-agglutinaters.

GLOSTER does not believe the non-agglutinating vibrios are true cholera vibrios modified in their serum reaction, because of the differences in haemolytic power.

W. J. P.

ROTKY (Karl). **Immunisierungsversuche gegen El Tor.** [Immunization against the El Tor Vibrio.]—*Prager Med. Wochenschr.* 1913. Vol. 38. No. 28. 5 pp.

The author states that his experiments have been somewhat contradictory, but he gives some representative results.

Immune sera were prepared by treating guinea pigs with, firstly, sterile fluid from subcutaneous oedema and serum of infected guinea

pigs, and secondly, with fluid from oedema containing the living vibrios. The serum so prepared was inactivated and used either with or without being exhausted by treatment with dead vibrios. Such a serum had a definite bactericidal effect *in vitro* in quantities of $\frac{1}{1000}$ of a c.c., while the same serum after exhaustion with the dead vibrios had no such effect in even $\frac{1}{10}$ c.c. quantities.

When the neutralizing power of this serum was tested on guinea pigs, it was found, however, that the exhausted serum had a marked protective influence even in quantities of $\frac{1}{1000}$ of a c.c.

Samples of fluid were taken from the peritoneum in the case of certain of the animal experiments and no phagocytosis or bacteriolysis was observed in the animals which had received the exhausted serum, though the vibrios diminished in numbers. Similar results were obtained in the case of mice and rabbits. The results are believed to be due to an anti-aggressin immunity.

W. J. P.

Bindi Nello. **Ricerche circa l'Affermata Modificabilità del Vibrione Colerigeno in Ambiente Idrico.** [Researches on the Alleged Modifications of the V. cholerae induced by Water.]—*Ann. d'Igiene Sperimentale.* 1913. Vol. 23. (New Ser.) No. 3. pp. 243-251. With 1 fig.

The water used in one series of experiments was being perpetually renewed, the organism being introduced into Berkefeld filters; in another series a definite quantity of water was taken and not changed throughout, though it was kept in movement. The properties examined were agglutination, susceptibility to lysis, and complement fixation. Seven strains of organisms were used. Every four days the agglutination tests were undertaken and found not to have altered. Bacteriolysis of strains was tested after twenty-four, forty, and seventy-two days, and no changes discovered. Fixation of complement tests also remained the same. The author cannot reconcile these with many opposing findings in the literature.

W. J. P.

Cano (U.). **Ueber die Wanderung des Choleravibrios im Körper des befallenen Tieres.** [On the Dissemination of Comma Bacilli in the Body of Infected Animals.]—*Centralbl f. Bakt.* 1. Abt. Orig. 1913. Dec. 16. Vol. 72. No. 3. pp. 124-126.

Rabbits not more than twenty days old were used for the experiments. Each received 5 c.c. of cholera broth culture by the mouth, which was fatal in all cases within 40 hours. The vibrios were recovered from the heart blood four times, cervical glands three times, liver twice, kidneys six times, and bladder four times out of nine animals experimentally infected. The bacilli were recovered from the heart's blood in one case six hours from the time of feeding with the culture.

W. J. P.

PUNTONI (Vittorio). **Azione della Tossina colerica sull'Intestino degli Animali sotto l'Influenza del Caldo Umido.** [On the Action of Cholera toxin on the Intestine of Animals under the Influence of Moist Heat.]—*Gazz. d. Ospedali e. d. Cliniche.* 1913. Nov. 23. Vol. 34. No. 140. pp. 1466-1469.

The paper recounts experiments investigating the cause of the higher case mortality from cholera and other diarrhoeal cases in the tropics. Variations of virulence of the organism are excluded from the research. The experiments were done with cholera toxins, obtained from three different vibrios by SANARELLI'S method. The animals selected for experiment were guinea pigs. The toxins were administered by the mouth daily with sufficient saturated sodium carbonate solution to produce slight abrasions of the mucus membrane of the gut. One series of animals was kept at 17° to 19° C with 50 to 60 per cent. saturation of the air, the other series at 30–32° C with 90–95 per cent. saturation of the air. All the toxins were found to be much more potent in the case of the animals in the warm humid atmosphere.

W. J. P.

CARRIERS.

GREIG (E. D. W.). i. **An Investigation of an Epidemic of Cholera caused by a "Carrier."**—*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 59-64.

ii. **An Investigation of Cholera Convalescents and Contacts in India.** *Ibid.* pp. 65-89. With a Map.

i. In Puri jail an epidemic of cholera occurred during the months of July and August of 1912. It was introduced by a prisoner admitted on the 23rd of July, who had been discharged from the cholera hospital on the 13th of July of the same year. On the 28th of July his faeces were found to contain a large number of cholera vibrios. A few days after admission cases of cholera commenced to occur in the ward in which he lived.

In the bacteriological examination peptone water was used in two successive cultures as an enriching medium before plating. Agar and Dieudonné agar plates were used and suspected colonies picked off and tested against a specific serum at once.

The faeces of the carrier were examined five times between July 28th and August 4th, and showed large numbers of specific vibrios on each occasion. A table is given showing the results of the examinations of the stools in the case of the 17 persons attacked and the terminations of the cases. A chart shows the incidence of the cases. The interest of the epidemic is that it proves almost beyond doubt that cholera carriers may cause an epidemic, and that the discharge of carriers from hospital is highly dangerous.

ii. The work was done on patients discharged from the Puri Hospital in 1912. The stools of 30 convalescents, at the time of discharge from hospital, were examined, and 36 per cent. of them were found to be excreting cholera vibrios. The geographical distribution in India of these convalescent pilgrims is carefully considered, and the significance of it in the spread of infection discussed. As an appendix to the paper a full account of the examination of the stools of the

cholera convalescents in a jail epidemic is given. The same patients were likewise tested for agglutinins in the serum. These histories show quite clearly that three consecutive negative results in the examination of the stools of convalescents by no means establish freedom from cholera carriage. This method has been recently suggested as sufficient, but Greig found as many as fifteen examinations negative and the next one positive. Non-agglutinating vibrios were found from time to time in convalescents free from the specific vibrios, but their significance is not elucidated. It appears that the detection of agglutinins in convalescents suggests cholera carriage. The temporary staff in charge of cholera cases was examined and six persons were found to be carriers out of 27 examined.

The question of dealing with convalescents and contacts is discussed. Segregation and destruction of the vibrios outside the body are the only means available at present. W. J. P.

DEFRESSINE (C.) & CAZENEUVE (H.). **Sur la Persistance du Vibrion Cholérique dans l'Organisme humain et dans quelques Milieux extérieurs.**—*Arch. de Méd. et. Pharm. Navales.* 1913. Nov. Vol. 100. No. 11. pp. 366-376.

The authors consider briefly the healthy, convalescent and chronic intermittent carriers.

In the case of healthy carriers mention is made of the work of PFEIFFER during the epidemics which developed from 1892 to 1896 in the basin of the Vistula. This observer found in a family of ten that four died of cholera, one showed grave symptoms and survived, two showed a slight form, while the other three who showed no symtoms of enteritis passed vibrios in their stools. Similar cases illustrative of this were found in subsequent epidemics in the Indies, Philippines, in Russia, Germany, Italy, Holland, and France, 20 per cent. of these healthy carriers were shown by Russian observers (1908–1909) to suffer subsequently from cholera, *i.e.*, they were "porteurs précoces." The commission of the Sanitary Conference of Paris (1911) concluded that carriers were few outside the epidemic foci or at the frontiers of infected countries, but many in the actual surroundings of the patients. This was illustrated by the authors' experience at Toulon in the autumn of 1911. In vessels coming from Tunis and Marseilles, where epidemics raged, 7 per cent. of healthy carriers were found amongst the sailors of uninfected ships, while in ships where cases had occurred no less than 44 per cent. were carriers. It appeared from these cases that the number of germs in the stools of healthy carriers was relatively small, and that the duration of the carrier state was found to last in no case more than eight days after the first discovery of the organisms in the stools. The strains isolated from the healthy carriers had all the typical characters of the specific germ. The convalescent carriers whose cases were investigated excreted specific vibrios on an average until the 11th or 12th day from the onset of symptoms of the disease, the longest persisting fifteen days. Three cases dead of cholera were examined *post mortem* for vibrios in the gall bladder, and these were present in each case. The findings suggested that the gall bladders were not infected *post mortem* or terminally. W. J. P.

LEVI della Vida (Mario). **Portatori ed Emuntori di Germi patogeni. Alcune Osservazioni Serologiche sui Portatori del Vibrione Colerigeno.** [Healthy and Chronic Carriers of Pathogenic Germs.]—From Vol. "*In Onore del Professore Angelo Celli nel. 25° Anno di Insegnamento.*" 1913. pp. 373-400. [Turin: Unione Tip-Editrice Torinese.]

The author uses "chronic carrier" to signify a carrier who has been through an attack of the disease, while a healthy carrier is one who has not suffered from the specific disease induced by the organism carried. The former class are usually recognized by correlating the clinical history with the bacteriological finding. In the latter class, of course, no evidence of the disease is obtainable in the case of the carrier, but others in the entourage of the patient have had the disease, and in some cases it is possible to say they have been exposed to the same infection. SCHELLER's case is quoted, where a chronic carrier infected milk from which 18 individuals became carriers without getting the disease. The importance of the differentiation of the two classes is that the healthy carrier has been believed to emit fewer organisms and to carry for a relatively short period. The presence of antibodies in the blood of a carrier has been thought to suggest that the carrier is of the chronic rather than of the healthy type.

The author examined 48 carriers for agglutinins; he gives a short description of each case—all except nine were found to give a positive reaction. He also examined the serum of these cases for bactericidal power, but found it absent in some cases which agglutinated well; it was never present when agglutinating power was absent.

He finds that the carriers fall into two groups. (1) Carriers with specific antibodies in the serum; (2) those without such antibodies; the former are chronic carriers, the latter are healthy carriers. The length of time during which vibrios are eliminated gives, he finds, no help in classifying the carriers.

W. J. P.

Book Review.

Goldi (Prof. Dr. Emil A.). **Die sanitarisch-pathologische Bedeutung der Insekten und verwandten Gliedertiere, namentlich als Krankheits-Erreger und Krankheits-Ueberträger. Zyklus von Vorlesungen gehalten an der Universität Bern.** [The Importance in Pathology and Hygiene of Insects and Allied Arthropods, especially in relation to Disease.]—155 pp. With 178 figures. 1913. Berlin: R. Friedländer & Sohn. [Mk. 9, or 9s.]

This admirable little text-book, critically surveying that borderland between the two biological domains of animal pathology and entomology which every student of tropical medicine must now explore is to be particularly commended for its "practical" merits, since it concentrates attention upon the main disease-circumventing ends and purposes of the survey. The amount of information sifted and condensed, without loss of sapidity, in its 150 pages, is truly astonishing; more matter with less art it would be indeed hard to provide.

Entomology appears in the assigned role of handmaid to pathology in the division of the subject-matter into three sections, each of which deals with arthropoda in one particular pathogenic aspect.

The first section, which fills about 18 pages, treats of arthropods that cause smarts and more serious injuries by means of irritant or venomous secretions, that are either injected by a sting of some sort, or merely come in contact with the skin. Here are passed in rapid review *Aculeate Hymenoptera*, blister-beetles, scorpions, centipedes, spiders, and caterpillars possessing urticating hairs, in most cases the structure of the particular weapon of offence and the nature and effects of the particular venom being concisely described. This section is illustrated by a great abundance of figures, which compensates for the absence of any descriptions or diagnosis of the species and groups stigmatized as hurtful; for an acquaintance with systematic entomology is taken for granted.

Among interesting items that will probably surprise medical men whose experience is limited to the tropical regions of the Old World is the statement that in Mexico alone from 200 to 250 children annually succumb to the effects of the sting of scorpions. The treatment of stings in general is briefly considered, but no mention is made of cocain.

The 95 pages of the second section are occupied with parasitic arthropods, as such. These the author separates into (*a*) true parasites, like the tick-flies, fleas, lice, bugs, ticks, mites, bot-flies, etc., which are structurally organized for a parasitic habit, and (*b*) semiparasites, like blood-sucking *Nematocera*, blood-sucking *Muscidae*, and gad-flies, which, though not much less rapacious than true parasites, have no inherent structural impediments to freedom. One cannot, however but regard as unsatisfactory an arrangement of this kind that puts the tsetse-fly and the bed-bug in different categories; it would seem more reasonable to regard both these insects as true parasites, not by adaptive modification of structure, but by definite limitation of habit; just as (to illustrate by analogy) the Dipper (*Cinclus*) and the aquatic *Hymenoptera* are none the less truly and completely aquatic, though they have no trace of any of the structural modifications that obviously distinguish the typically aquatic bird and insect.

In the treatment of all these parasitic and semiparasitic groups the author concentrates on habits, manner of life, metamorphoses, structure of pertinent organs, incidence, significance, etc., with little attention to taxonomic detail, but with a profusion of most eloquent figures. The *Culicidae* are dealt with in this graphic and effective manner in about two dozen pages, and though the mushroom growth of mosquito-literature is depicted in vivid language, its general stimulating effect upon the official mind is commended. All that is needful is said about the *Simuliidae* and *Ceratopoginae* in five and a-half pages, and about lice and bugs in seven pages, and thanks to the abundance of well-chosen and well-

executed figures an excellent general impression of the ticks and their doings is conveyed in nine pages. The illustrations of the flies concerned in myiasis, both larvae and the adults into which they transform, are particularly good. On the other hand, a single page for *Phlebotomus* and two pages for the tsetse-flies, when compared with nine and a-half pages for *Tabanidae* and three and a-half pages for the *Pupipara* seems a little wanting in proportion, and the omission of the *Linguatulida* is surely an oversight unless, indeed, the author is not satisfied that this aberrant little group should be linked with the Arthropoda.

The third section, of 29 pages, is devoted to Arthropoda as carriers of various noxae. These the author distinguishes as (*a*) mechanical carriers, namely, houseflies and fleas ; and (*b*) biological carriers, among which bugs and lice are included, as well as mosquitoes, tsetse-flies and ticks, an arrangement to which, perhaps, not everyone will assent. This section deals concisely and graphically with the development and location of various blood parasites of man and certain domestic animals in their several insect carriers, and with the ultimate pathological effects upon the final hosts. It also alludes, though rather inadequately, to the influence of the flea in connection with bubonic plague, and mentions some of the sanitary objections that have been raised against the house-fly. Like the other sections, it is most effectively illustrated.

A. Alcock.

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[Continued from BULLETIN, Vol. 2, pp. xxxv-lxv.]

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